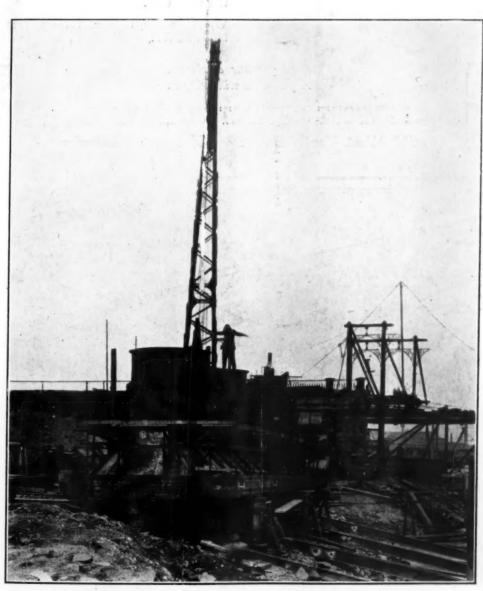
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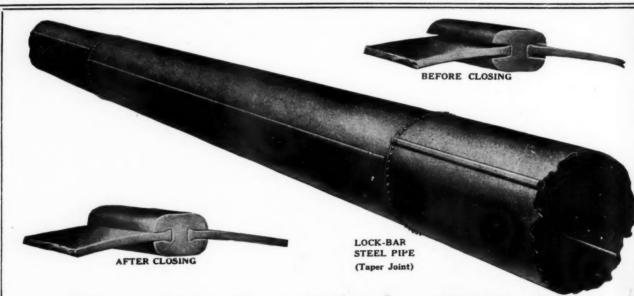
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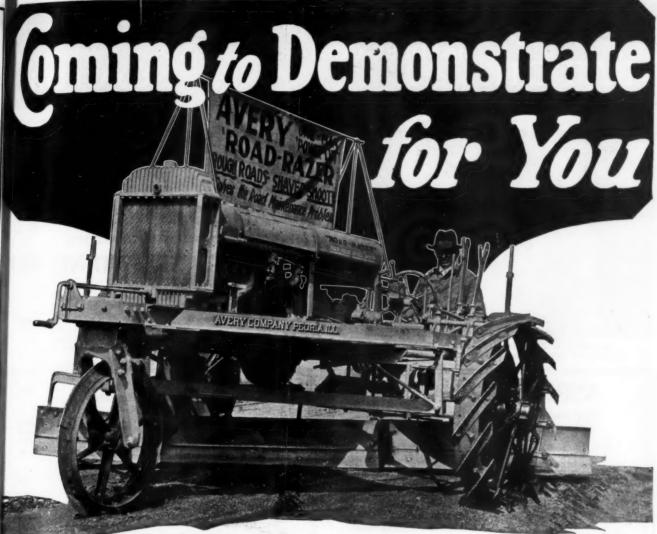
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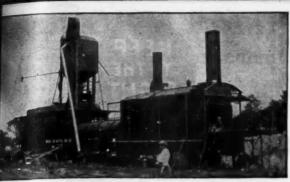
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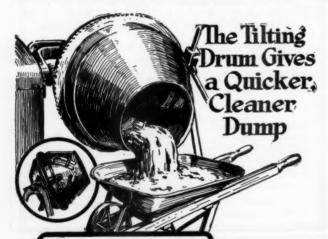


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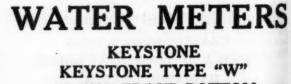
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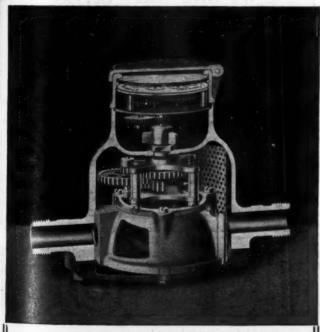


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A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol. 53

July 29, 1922

No. 5

Enlarging Harrisburg Filtration Plant

New sedimentation basin with some novel features, and anchoring new influent and effluent flumes to sides of old basin. New intake protected from needle ice and ice jams, with steam-heated grating at entrance. Also new filters and head house.

The city of Harrisburg, Pa., obtains its water supply from the Susquehanna river and, although the supply is abundant in quantity, it presents in quality some objectionable features peculiar to streams of this section, the most important being the large amount of coal dust that is brought down from the coal mines further up the river, clay turbidities running up to 3,000 pp. m., and sewage pollution. Filtration is necessary and has been employed for many years.

The fine coal carried down by the river has its advantageous as well as its objectionable features, in that deposits of it in the river bed all along the stretch in the vicinity of Harrisburg are used as a source of fuel supply for industries of the vicinity, including the Harrisburg pumping plant. Fine coal brought down by freshets and by the ice in the spring is deposited all along the channel of the river and is dredged out, screened and sold at a price lower than coal direct from the mines. Prior to the war this so-called "river coal" sold for considerably less than \$1.00 a ton but now brings about \$1.50. Having a specific gravity little heavier than water, the fine coal passes in considerable quantities into and through the pumps which lift the water into the sedimentation basin. Here the low velocity permits the sedimentation of a large part of the suspended matter, but it seems to be impracticable to entirely prevent the finer particles from reaching the rapid sand

The plant built several years ago consisted of twelve filter units each with a nominal capacity of 1,000,000 gallons per day; a clear water basin underneath these filters; a sedimentation basin, coagulating basin, and pumping plant for raising the river water into the basin. The entire plant is located on an island adjacent to public athletic grounds. As a protection from high water, the plant is surrounded by a levee, the outer slope of which is paved with concrete. The filtered water passes from the clear water basin through a 42-inch pipe under the river to the main pumping plant on the main land opposite the island, known as the Front street pumping station.

In October of last year bids were received for additions to the water works, the work being let under four contracts. Contract A for Extensions to the Water Purification Plant, awarded to Whiting Turner Construction Co., of Baltimore, Md., consists of 8 new filters, a filter house, head house and gate house, new sedimentation and coagulating basins, a secondary intake for winter use and new pumping units. Contract B, for enlarging the main pumping station on the mainland and installing two new 15 M. G. D. turbine-driven centrifugal pumps, with boilers and accessories; contract C for a half-mile of 46-in. cast iron pipe; and contract D for a new athletic field to replace one, the site of which was required for the filter plant, are not described in this article. The entire work will cost \$800,000.



GENERAL VIEW OF NEW SEDIMENTATION BASIN.

In the background, effluent flume, with intake openings. At the right, concreting the upper tier of panels of slope lining. At center of right-hand wall is concrete chute. The fourth panel to the right has been placed and is being screeded.

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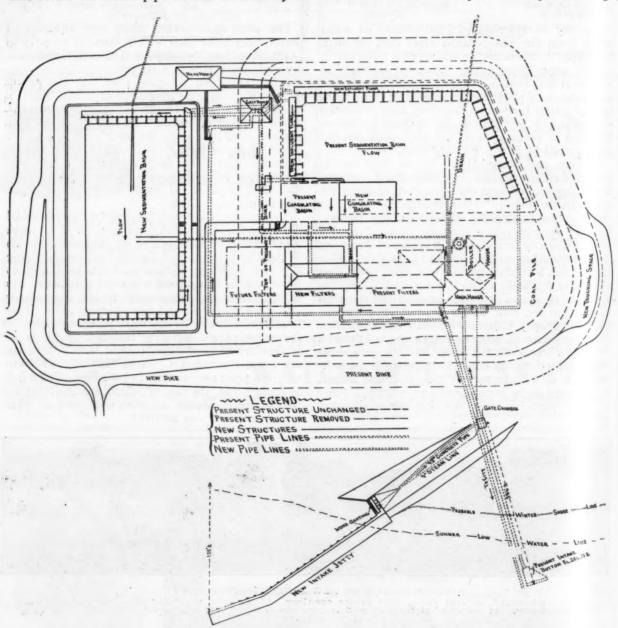
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One of the features of the extensions a little out of the ordinary is the new intake and the jetty provided to protect it. The intake pipe is 42 inches in diameter, of reinforced concrete and extends for about 150 feet from the present intake pipe, which it joins at a gate chamber. Considerable difficulty has been experienced in the past with needle or slush ice entering the intake and ice jams which fill the entire river channel with broken ice, allowing but a small passage of water through them. With a view to preventing this and also to protecting the intake from outgoing ice in the spring, the intake pipe is covered with an embankment, the pipe and embankment extending about to the line of summer low water. The up-stream slope of the embankment is paved with concrete. The end of the intake will be covered with a grating to keep out large floating matters. The upstream face of the embankment that covers the intake pipe will be extended by an

intake jetty of concrete; the line of intake pipe, embankment and jetty making an angle of about 30 degrees downstream with the line of the river. The concrete jetty will be about 250 feet long and will create quiet water behind it in front of the intake pipe and thus permit needle ice to float upon the surface and prevent its entrance into the intake pipe. It will also give a better means of drawing water from the ice jams.

The intake jetty will be constructed of a series of slabs of reinforced concrete, each slab being 9 feet long, 3 feet wide and 10 inches thick; these slabs resting upon piers of reinforced concrete with the upstream face having a slope of 45 degrees and the downstream face a batter of 1 in 8. These piers are spaced 10 feet apart on centers and are connected by a top deck consisting of a concrete slab 3 feet wide and 2 feet thick, as well as by the slabs beforementioned which rest upon their upstream edges,



GENERAL PLAN OF HARRISBURG WATER PURIFICATION PLANT, SHOWING EXTENSIONS AND CHANGES.

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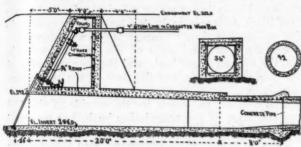
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there being 7 slabs connecting each pair of piers. Slots are left between the slabs in order to reduce to a minimum any differences in elevation of the water on the upstream and downstream faces. This jetty rests upon rock in the river which has only a shallow covering of earth, and has an average height of about 12 feet. The piers are built of 1-2½-4½ concrete and the slabs of 1-2-4 concrete. Each pier is anchored to the rock by a number of steel rods one inch square, which are carried 3 feet into the rock and the same distance into the piers.



VERTICAL SECTION OF INTAKE CHAMBER AND MANHOLE.

A 4-inch steam line encased in a 12" by 12" timber box, which also contains four 1-inch pipe lines to operate the hydraulic valves at the intake, is carried from the boiler plant over the dike and to the intake, the steam line being continued to the river end of the intake. By means of the hydraulic lines it will be possible to open and close the valves controlling the two intakes during high water when the river will be several feet above them.

The reinforced concrete intake pipe ends in an intake chamber which is funnel-shape in plan, 4 feet high from invert to roof, 15 feet long, and 20 feet wide at the outer end, and is roofed over with reinforced concrete. The concrete pipes were made by the Lock Joint Pipe Co., with cast iron ends and lead expansion joints. Above the end of this intake chamber is a manhole, into which the 4-inch steam line passes, where it termintes in two lines of 2½-inch steam pipe which extend out to the grating, which is formed of 38 extra-strong wrought iron pipes, spaced 6 inches apart center to center and

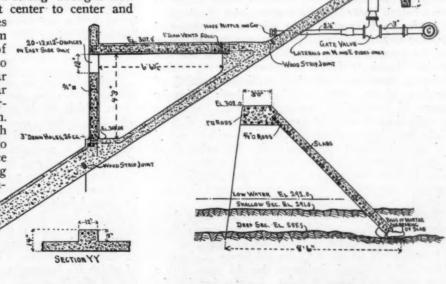
set inclined about 30 degrees from the vertical. The steam pipes convey steam to each of the 2-inch grating pipes, to which they are connected near the top. A ½-inch vent near the bottom of each pipe permits the escape of the steam. The steam so passing through the grating pipes is expected to prevent the collection of ice thereon. Each of these grating pipes is anchored in the con-

crete bottom of the intake chamber and extends above the top of said chamber.

The new sedimentation basin will be 236 feet long by 114 feet feet wide at the foot of the slope and 16 feet deep. The banks will rise 24½ feet above the bottom of the reservoir at the higher end, the opposite end being a foot and a half lower in order to permit draining it. The basin is rectangular with the corners connected by curves having a uniform radius of 3 feet from top to bottom.

A flume surrounds the reservoir on one side and both ends, that at one end serving as an influent flume while that on the other end and one side serves as an effluent. This flume is built in the form of a hollow bench about half way up the sloping sides of the reservoir, the vertical face and horizontal top, with the sloping basin lining, giving it a triangular shape. In the face of the influent flume there are 25 rectangular openings 9 inches by 10 inches, set with their bottoms 10 feet below the water surface. Similar openings but 12 inches by 12 inches in area and 20 in number are built in the outlet flume, being set with their bottoms $4\frac{1}{2}$ feet below the water surface.

The sides of the reservoir have a slope of 1 on 11/2 and are faced with 6 inches of concrete mixed 1-21/2-41/2. The lining is laid in three tiers, each being built in alternating slabs 7 feet wide. In constructing the first slabs, a one-inch wooden strip is used as a form, and in filling in the spaces, these strips are left in place to serve as expansion joints; the swelling of the wood by absorbing water being relied upon for keeping the joints water-tight. The concrete is mixed on top of the bank and is discharged through a chute which drops it approximately where wanted, although it is necessary to re-handle it by shovel. After the concrete for a slab has been deposited and roughly faced, it is screeded off and a surface of cement mortar is applied and troweled down to a smooth finish. Owing to the slope, the concrete has to be mixed rather dry, as it would be impossible to ram it sufficiently to flush



SLOPE LINING AND EFFLUENT FLUME, SEDI-MENTATION BASIN.

SECTION OF INTAKE JETTY.

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the mortar to the surface without at the same time causing it to slide down the bank; hence the necessity of applying the thin mortar surface, which is done as soon as the concrete is in place.

In order to drain the sedimentation basin to permit cleaning it or for other purposes, a gutter is constructed in the bottom leading to an 18-inch reinforced concrete pipe. This gutter has a fall of one foot in the length of the basin. Thirty-three two-foot lengths of halves of 24-inch steel pipe are to be set over the gutter, convex side up, as covers to prevent the sediment from filling the gutter and the blow-off pipe. In cleaning the reservoir, when the sediment has been removed up to and from around the end cover, this cover is lifted, and so on with each successive cover until the entire basin has been cleaned, when all the covers will be replaced preparatory to putting the basin in service again.

The present sedimentation basin is also to be provided on three sides with flumes similar to and having the same dimensions and general construction as those in the new basin. In order to tie the flumes to the old basin lining, the old lining is to be broken through at numerous points along horizontal lines corresponding to the connection of the top and bottom walls of the flume with the lining. Along these lines 12 by 12-inch openings will be broken in the lining at intervals of 5 feet and the earth excavated beneath such openings to a depth of about a foot, and two 1/2-inch anchor rods inserted in each hole to tie the flume concrete to the anchor concrete which is rammed in each of these holes and made monolithic with the concrete of the flumes. A new concrete facing is also to be placed on top of the old lining in the flume. Struts 8" x 12" and 12 ft, c.c. extend from the bottom of the flume to the bottom of the basin, a distance of about 11 feet. At the junction of the struts and the bottom lining of the basin, holes similar to those above are broken through the old lining to provide anchorage. This flume in the old basin will have openings or ports similar to those in the new basin. The existing flumes have become damaged and at present water enters the old basin at two points only and the full width of the basin is not effective, there being an area of slack water between the two inlet openings.

A new head house is to be built at one corner of the new sedimentation basin and near the old basin, and the water from the pumps will pass near this and receive chemicals from it before entering either basin; a gate house nearby permitting control of the flow of the water to either or both basins by means of hydraulicly operated valves. The levee or embankment extends level with the second floor of the head house where the chemicals will be stored and thus furnishes opportunity for delivering them directly to the storage floor without the necessity for using bucket elevators or other similar contrivances generally necessary. A new concrete road is being built on top of the dike.

Between the basins and near the head house there exists a coagulating basin, and a new coagulating basin will be constructed adjacent to this.

Immediately adjacent to the old filters, eight new filters will be placed similar to the old ones, with a clear water well beneath them. Excavation for the clear water well goes down to and 2 ft. into rock and thus furnishes solid foundation for the clear well, filters and superstructure. The new filters will occupy a space 70 feet long by 65 feet wide and 9 feet deep. The clear water well extends to a further depth of about 11 feet.

CONCRETE CONSTRUCTION

The pavement on the slopes and bottom of the sedimentation basin was poured in blocks each of about 50 square feet area. Between the blocks were placed strips of white pine or poplar 1/8-inch thick and extending 21/2 inches down from the surface, the wood strip being set at the time of pouring the first block adjacent to it and being kept absolutely dry up to that time. Similar strips are placed between the floors and walls of the coagulation basin and the filtered water basin and between the walls of the coagulating basin and the floor of the sedimentation basin.

The concrete pavement for the outside of the dike and the floor of the coagulation basin has no wood strips, but is provided with steel reinforcement.

Another requirement connected with the concrete construction is that, in the case of the filtered water basin and the supports for the filters overhead, the transverse arches and the piers supporting them are to be built monolithic, as are the flat longitudinal arches supporting the filters, each of the latter being separated from its fellows over the center lines of the piers by a space one inch thick at the top and 1/2-inch thick at the bottom and reaching down from the top to a depth of 10 inches, using metal covered strips to secure this result. These strips are to be removed about 24 hours after the concrete has been placed on the entire set of four filters. After they have been removed and the centers have been eased, such amounts of thin grout will be poured into the spaces previously occupied by the strips as may be directed by the engineer, and the balance of the spaces will then be filled with Portland cement mortar mixed one part cement to two parts sand, placed in layers 2 inches thick and tightly tamped with heavy iron tampers; this packing to be mixed dry and tamped as tightly as possible.

The superstructures of the filter house, head house and gate house are being built of red brick to match in color, size and texture those in the existing filter house. Window sills are of Portland cement con-

FILTERS

Each filter is to contain two troughs for distributing the raw water and removing the wash water, which will be constructed of sheet steel channels and flanges, covered with steel pipe coating. Each trough is 26 feet 9½ inches long and increases at a uniform rate from 14 inches inside diameter at one end to 18 inches inside diameter at the other, and from a height of 10 inches at one end to 12 inches at the other. The trough is supported by two 3-inch 5-pound channels, one along each upper edge, while the channels themselves are supported by the walls at the two ends, and at four intermediate points by suspender rods of 3%-inch galvanized steel, 4 feet 5 inches long, the upper ends of which are fastened to concrete beams spanning the top of the filter.

The underdrainage system consists of a manifold

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of 11/4-inch wrought iron pipes extending each way from the center, where they are screwed into 11/4 by 11/4 by 2-inch tees. These tees are connected to a large cast iron manifold which connects with a 14-inch cast iron pipe suspended from the underside of the filter floor. These 11/4-inch pipes are spaced 6 inches between centers. Each pipe carries holes 7/32 of an inch in diameter and 3 inches apart, in a line located exactly at the bottom of the pipe, for the entrance and exit of filtered and wash water. Each filter contains 54 pairs of these small pipes or laterals, which will be so set in place, supported on wooden blocks, that all shall be in the same horizontal plane, and cement is then placed around them near the ends and the center, but so as not to close any of the holes, the wooden blocks being left in place until the cement is thoroughly set. This drainage system, it is seen, is a very simple one. It is required that all wrought iron pipe used in the filters be genuine wrought or puddled iron.

Each filter is 16 feet by 27 feet and 9 feet deep from top of floor to underside of roof. The greater part of the filter extends outside of the walls of the superstructure, where it is roofed over, the opening within the superstructure and adjacent to the pipe gallery being 5.5 feet wide.

The filters are arranged in the customary manner, in two rows one on each side of the central pipe gallery, which is 15 feet wide.

Portable sand ejectors are to be provided, each consisting of a hopper constructed of No. 12 B. W. G. galvanized steel plates riveted to a 1 by 1 by \(^1\)4-inch angle at each corner, this resting on a cast iron base into which are screwed nozzles which form the ejector apparatus. The whole is mounted on 8-inch by 1\(^1\)2-inch oak planks, the base being 27 inches by 22 inches out to out. Near the tops of the hoppers are fastened two forged steel handles for carrying the sand ejectors. The top of the hopper is 22 inches square and the entire ejector apparatus is 21 inches high. The outer end of each nozzle carries a female brass swivel hose connection, \(^1\)2-inch on the inlet end and 3-inch on the outlet. The end or throat of the outlet nozzle is made of chilled cast iron.

Underneath the filters is a filtered water basin which is 69 feet long and 64 wide, extending from out to out of the filters. The roof of the basin is formed of concrete arches, which support the floors of the filters and are themselves supported by short piers 3 feet square that rest on bed rock. The basin is 91/2 feet high from top of floor to underside of the crown of the roof arches. The bottom of the reservoir is about 3½ feet below summer low water in the river. The spaces between the haunches of the arches and the underside of the filter floors are to be filled with sand deposited in water before the construction of the filter floors is begun, so as to secure a perfectly solid support for such floors. The walls and arches of the filtered water basin are of heavy concrete without reinforcement, but the floor, walls and roof of the various filter units are of reinforced concrete.

The orifice box carries in the bottom a bronze orifice plate with an opening 8% inches in diameter, in which plays vertically a bronze "needle"

(so-called) which is in shape similar to a plumb bob with a maximum diameter of 8.24 inches, or slightly less than that of the opening. This needle is fixed to the end of a vertical bronze shaft one inch in diameter. The shaft and the needle attached to it are raised by the revolving of a bronze gear wheel, in the threaded center opening of which plays the threaded portion of the needle shaft. By connection with the operating table, the needle can thus be raised or lowered from there at will.

DIKE ENLARGEMENT

As before stated, a dike surrounds the entire plant to protect it from floods in the river. is wide enough for a drive, but not to permit the turning of the trucks that are used for bringing coal to the pumping plant. There is under construction an additional width to the embankment at a point opposite the coal pile, giving a total width of 35 feet for a distance of 100 feet at this point to permit the turning of the trucks. The slope of this new embankment also is paved. In order to prevent the sliding of the new fill over the surface of the old slope paving, this latter was broken through along horizontal lines 5 feet apart measured along the slope pavement. In these holes were driven 2 by 4 stakes at right angles to the slope, which project about 6 inches above the concrete and which carry on their upper surface 1 by 6-inch boards, the lower edges of which rest upon concrete slope pavement. The holes through the pavement were then filled with 1-3-6 concrete, the outer part of which was struck off to a horizontal surface. These form horizontal steps along the old slope pavement at intervals of 5 feet, the purpose of which is to prevent the new earth fill from sliding on the surface of the old slope pavement.

James H. Fuertes was retained to enlarge the

James H. Fuertes was retained to enlarge the plant, which he built seventeen years ago, on substantially the lines of the original plant. F. H. Weed is resident engineer in charge of the filters, and Jepita A. Wade is in charge of the Front street pumping station and force mains. The work herein described is being done by the Whiting-Turner Construction Co., of Baltimore, with John H. Merritt as superintendent in charge, and H. G. Campbell as engineer for the contractor.

Flushing the Sewers in Waltham

Waltham, Mass., has $47\frac{1}{2}$ miles of sanitary sewers, including six inverted siphons. These serve an area of 3.1 square miles out of the total area of the city of $13\frac{1}{2}$ square miles. However, the water mains serve only about 65 miles of street so that the sanitary sewers cover about three-quarters the street length reached by the water mains.

For flushing the sewers, 2½-inch hose connected to fire hydrants is used where there are hydrants within 100 feet of the flushing manholes. But 124 manholes are not so located and these are connected directly with the water mains to provide for flushing. In addition to flushing sewers, they are cleaned by use of ropes, chains, followers and scrapers of different kinds. During the year ending January 31st, 1922, there were 20 stoppages in the sewers.

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Resurfacing Old Pavements*

Methods reported by city engineers for renewing or covering worn wearing surfaces of brick, stone block and wood block pavements.

Lakewood, Ohio, levels off the old base with a binder course and surfaces with sheet asphalt

or asphaltic concrete.

In Middletown, Ohio, the old brick is first cleaned by sweeping and brushing and is then covered with a 1½-inch layer of crushed stone, 1½-inch size. Tarvia X is then applied, about one gallon per square yard followed by stone chips about ¾ of an inch deep. The pavement is then rolled with a steam roller. Tarvia X is then applied at the rate of about ½ gallon per square yard and covered with about ¼-inch of torpedo sand. Another application of ½ gallon per square yard of Tarvia X is applied and the pavement is rolled. After the street has been subjected to travel for three or four months, the surface is cleaned and a half gallon per square yard of Tarvia B is applied and the surface covered with torpedo sand and rolled.

Sandusky, Ohio, covers old brick pavements with 13/4 inches of sheet asphalt on a one-inch binder, after first filling depressions in the old brick pavement with additional binder and tamp-

ing it.

South Point, Ohio, either turns over the brick or covers the pavement with sheet asphalt.

Toledo, Ohio, does not believe in resurfacing over old brick pavements where the brick was not laid on a concrete base.

Washington Court House, Ohio, resurfaces with 1½ inches of sheet asphalt on a one-inch

Wilmington, Ohio, covers the pavement with

sheet asphalt.

Altoona, Pa., relays old brick pavement, turning the brick and supplying enough new brick to take the place of those that are entirely worn out. After removing the brick, uneven places in the base are leveled up with concrete and the brick is laid on a slag cushion. Where the brick has no salvage value, the city has been replacing old brick pavements with new reinforced concrete pavements, this also being done where the base is found to be in poor condition.

In Beaver Falls, Pa., old brick pavements are thoroughly cleaned and enough binder applied to restore the crown and are then covered with 2

inches of asphaltic concrete.

Chester, Pa., last year resurfaced one brick street with asphalt, the bricks being thoroughly cleaned with steel brooms and thoroughly painted with an asphalt coat. On this a 2-inch sheet asphalt surface was laid. Where this abutted an asphalt pavement, the latter pavement was cut back and, at the other end where it abutted a brick pavement, the bricks were removed for about 3 feet and the surfaces brought up with additional thickness of binder.

In Du Bois, Pa., in 1909, 17,000 yards of brick were resurfaced with 2½ inches of asphaltic con-

crete.

Franklin, Pa., uses sheet asphalt with a binder course on old brick pavement.

Greenville, Pa., contemplated resurfacing 25,000 square yards with sheet asphalt or warrenite.

Jersey Shore, Pa., resurfaced brick with K. P.

and 34-inch chips followed by screenings and dust. Oil City, Pa., cleans the pavement and fills depressions more than one-inch deep with binder, then lays binder with one-inch minimum depth and a

1½-inch top of standard sheet asphalt.

Sewickley, Pa., uses 2-inch thickness of bituminous

concrete.

Sharon, Pa., repairs broken base and deep depressions in the old brick surface with new concrete brought level to the surrounding surface, shallow depressions being filled with asphalt binder. The old pavement is thoroughly cleaned and covered with the usual thickness and mixture of sheet asphalt or

asphaltic concrete.

Uniontown, Pa., in 1921, resurfaced 11,000 square yards of old brick pavement with tarvia macadam 2½ to 3 inches thick. After washing and sweeping the pavement, ½ to ¾ gallons of tarvia per square yard was spread and on this was placed about 3 inches of ballast size crushed stone, which was lightly rolled. About 13/4 to 2 gallons of tarvia per square yard was then poured and sufficient 1/2-inch to 3/4inch stone screenings were spread to fill all voids. This was thoroughly rolled with a 12-ton roller. All loose screenings were then swept up and 1/2 gallon of tarvia per square yard was poured and covered with a coat of 1/16-inch to 1/8-inch silica gravel and rolled until firm. Traffic was then admitted and after about 6 weeks of use the street was swept and ½ gallon of tarvia A per square yard was spread by pressure tank and this was covered with silica gravel and rolled. This street looks like sheet asphalt and is in a very satisfactory condition. It was anticipated that when warm weather arrived this summer it would be desirable to spread an additional thin coat of silica gravel to absorb any excess tar, as the weather was cold when the last coat of tar was applied last year. The total cost of material and labor for this work was \$2.05 per square yard.

Wilkes-Barre, Pa., cleans out crevices in the old pavement and applies binder and sheet asphalt. Wilkinsburg and Williamsport, Pa., have resur-

faced with new brick.

Beaumont, Tex., uses from ½-inch to one-inch of Uvalde rock asphalt for covering old brick pavements.

Fort Worth, Tex., covers the brick with a flush coat of asphalt and lays 1½-inch of Uvalde rock asphalt.

Houston, Tex., uses 2 inches of Uvalde rock as-

phalt

In Danville, Va., sheet asphalt is laid direct on the old pavement, the surface first being thoroughly cleaned by washing or sweeping and all depressions

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filled with close binder to bring the pavement to an even surface. 1½-inch binder is used and 1½-inch top.

Norfolk, Va., lays 11/4-inch binder and 11/2-inch

sheet asphalt top.

In Parkersburg, W. Va., specifications for resurfacing brick pavements with sheet asphalt call for cleaning the pavement with steel brooms until the surface is absolutely clean, if necessary flushing with water until all joints are cleaned and then allowing to dry thoroughly. Depressions or holes are entirely filled with binder or concrete properly compacted in place, this material being paid for at a unit price per ton. If the gutter would normally be too shallow after applying the asphalt, the brick for a distance of 3 to 4 feet from the curb is to be taken up and replaced with concrete base. Catch basin screens or manhole covers are raised so as to conform to the new pavement surface, using bricks laid in mortar under the casting for this purpose. Following this, after the concrete has set, a binder course one-inch thick is laid and on this a surface course 11/2 inches thick, using the specifications for sheet asphalt pavement; this being paid for at a unit price per square vard. The contractor is to guarantee the work against poor workmanship and material for six months after final acceptance.

In Oshkosh, Wis., brick pavement is generally resurfaced by turning the brick, replacing broken bricks with whole ones. About 6,000 square yards were covered last season with a mat of tar, roofing gravel

and sand 1/2-inch thick.

In Milwaukee, Wis., old brick pavements are resurfaced by removing the brick and substituting a 3-inch asphalt pavement. In a very few cases the bricks have been turned, but this has not proven very satisfactory.

Appleton, Wis., uses tarvia in repairing old brick

pavements.

STONE BLOCK

City Engineer Prann, of Meriden, Conn., does not recommend resurfacing on stone block, but would tear up the old block and relay it on the

old foundation if this is of concrete.

New Haven, Conn., lays 1½-inch binder and 1½-inch top on old stone block. In some cases the blocks are removed and the additional thickness of pavement necessary to bring up to grade is made with an extra thickness of binder and the wearing surface is made 2 inches instead of 1½-inch.

Norwich, Conn., has covered some stone block

streets with sheet asphalt.

Chicago, Ill., cleans out the joints between block and cleans the surfaces, then lays 1½ inches of binder covered with 1½ inches of sheet asphalt or asphaltic concrete.

Portland, Me., takes up stone blocks, recuts them and relays them on a concrete base with

cement grout filler.

In Cambridge, Mass., stone block is usually recut and relaid on concrete base with cement grout filler. Holyoke, Mass., either recuts and relays blocks

or replaces them with concrete.

New Bedford, Mass., last year resurfaced 17,832

square yards of rough block pavement with one inch of bitulithic.

Newark, N. J., on heavy traffic granite pavements has used a 50-50 mixture of asphalt cement and sand. Heavy traffic streets have received this treatment with great success, and the method has been adopted by the state highway engineer for repairing some of the state highways.

Brooklyn, N. Y., recuts and relays granite

blocks.

Greensboro, N. C., has resurfaced only stone block pavements with sand filler and has found it most satisfactory to take up the block, recut them and relay them with asphalt or cement filler.

Toledo, Ohio, usually resurfaces old medina stone pavements with 1½ inches or 2 inches of asphaltic wearing surface, using enough binder to give a minimum thickness of ½-inch and leave a uniform thickness of top or wearing coat. The old pavement is prepared for resurfacing by cleaning out the joints to a depth of ½-inch to 1 inch, raking them out with sharp pointed iron tools, then washing the pavement clean with hose. It is then covered with a close binder of asphalt surface prepared as for standard asphalt pavements.

In Parkesburg, Pa., stone blocks have been relaid in bitumen and surfaced with tarvia.

WOOD BLOCK PAVEMENTS

In Faribault, Minn., wood blocks have been covered with Tarvia B and sand about 1/4 of an inch thick.

Cape Girardeau, Mo., has surfaced the old wood block streets with concrete 4½ inches thick re-

inforced with 34 pounds of fabric.

Altoona, Pa., has resurfaced wood block pavement by removing the blocks and grouting the old base to the true contour of the street and relaying the blocks on a thin bituminous coating, filling the joints with tar to a point 1/3 the height of the block, then filling flush with a filler of trap rock dust.

Wichita Falls, Tex., tore up about two blocks of wood block last year, painted the concrete base with asphalt and resurfaced with 4 inches of reinforced concrete. Also it treated about 40,000 square yards of wood block with ½ gallon of Tarvia B in order to waterproof the blocks and

prevent buckling.

(To be continued)

Cost of Horse Maintenance

In the annual report for 1921 of the Street Cleaning Department of Cincinnati, the superintendent, Fred Maag, gives as usual quite complete figures covering the operations of the department. Among these are those bearing upon the cost of the maintenance of the horses used by the department and the work done by them.

The horses are kept in 14 stables, there being altogether about 185 horses and 23 mules, 7 stables containing only 2 animals each. The average cost of feed in all the stables for the year was 39.3 cents per horse per day. The cost varied by months and

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also in the various stables. For instance, averaging all the stables, the feed cost varied from a minimum of 32.7 cents in December to 46.9 cents in March. This variation is probably due largely to that in the unit cost of food during the year. Between the stables, however, the variation was even greater, the minimum daily average for any one stable for the year being 30.4 cts. and the maximum being 53.4 cts.

These costs are made up of the costs of hay, oats, nutritia, bran and oil meal. Averaging all of the stables and the entire year, the daily consumption per horse per day was 16.1 pounds of hay, 12.7 pounds of oats, 1 pound of nutritia (this was used in January only), about .0093 pounds of bran and .0011 pounds of oil meal. The bran was used only from September to December, inclusive, and the oil meal in January, April, June, September and November.

The idle time of the horses averaged (excluding Sundays) about 5.5 days per month, varying from a minimum of 4.8 in April to a maximum of 7.1 in August. The idle days ranged from a minimum of

30 per cent. in April to a maximum of 40 per cent, in July.

In addition to the cost of feed, the other stable expenses, by months, averaged from 50.4 cents per horse per day in January to 97.4 cents in April; giving a total stable cost per horse per day, averaging all stables, varying from 83.7 cents per horse per day in October to \$1.419 in April. Allowing for idle time, this gives a total stable cost per applied horse day varying from a minimum of \$1.355 to a maximum of \$2.043.

The greater part of the horses were used in ash removal, nearly as many being so used in summer as in winter. For instance, the number of horse-days employed for ash removal was 2,324 in July while the maximum was 2,906 in March, with 2,891 in January. The horse-days used for removing street sweepings varied from a minimum of 833 in February to a maximum of 1,208 in October. The next largest use was in sewer cleaning, in which from 280 to 372 horse-days per month were used.

South Street, Philadelphia, Bridge Piers

Steel and timber caisson foundations rapidly sunk by open well dredging followed by pneumatic caisson excavation. Old cylinder piers removed by dredging and dynamiting. Superstructure cut up with oxyacetylene torches

The South Street highway bridge across the Schuylkill river, Philadelphia, was built in 1875-6 with one swing span 119 feet long center to center of rest piers, and two flanking spans of 189 feet from center of rest pier to face of abutment, all of them having wrought iron pin-connected trusses, designed for much lighter loads than those furnished by the present traffic, and having insufficient clearance for street cars and vehicular traffic on the swing span. The pivot pier was a braced cluster of 9 concrete-filled cast iron circular caissons, 4 feet in diameter except the center one which was 8 feet in diameter. The rest piers each had two 8-foot iron cylinders which, like those of the pivot pier, had been carried through sand, mud and gravel by the pneumatic process to bearings on rock at elevations varying from about 33 feet to 54 feet below datum, which is approximately 71/2 feet above low water The superstructure was reinforced in 1897 and the piers were strengthened in 1895 by enclosing them with wooden cribs and building masonry around the cylinders.

It was recently decided to replace the old superstructure and its four piers by new construction of greater weight and capacity for highway traffic and affording more clearance for navigation.

New piers were therefore designed to clear the old piers and provide for a channel of 100 feet between the main piers, which support a two-leaf basule plate-girder span, on each side of which there are two plate girder spans of 128 feet 6 inches and 97 feet 4½ inches from center to center of piers and from center of piers to bearings on old abutments, which are retained.

The work was designed to avoid interference with

the city traffic for as long as possible, and the contract, including the removal of the old structure, was awarded to the Dravo Contracting Company, Pittsburgh, for \$650,000.

No attempt was made to disassemble the old truss members, but these were cut into convenient lengths by seven oxyacetylene torches installed by the American Bridge Company, subcontractor for this work and for the fabrication and erection of the new superstructure. The old crib work was removed and the original piers were shown to be in a weak condition and damaged by vertical cracks probably caused by the freezing of water contained in them. The cylinders were cut off at the bottom of the dredged excavation, about 26 feet below low water level, by means of strings of dynamite cartridges contained in pieces of old hose pipe and tied around the cylinders by divers. The firing of these cut off the cylinders, which then were easily removed by tackles suspended from a very heavy A-frame installed on a scow and serving as a powerful floating derrick

Pier No. 4, on the East side of the river, was built in dry excavation and piers Nos. 1, 2 and 3, in the river channel, were built by the caisson process. Pier No. 1, supporting the fixed spans at the West end of the bridge, has a caisson 15½ feet wide, 71 feet long and 50 feet high. The twin piers No. 2 and 3, supporting the bascule span, have duplicate caissons 26½ feet wide, 109 feet long and 40 feet high. They all have structural steel cutting edges and a steel plate roof over a working chamber 7 feet high, above which the walls are of timber in one 18 foot course and one 12-foot course surmounted by a detachable wooden 12-foot cofferdam.

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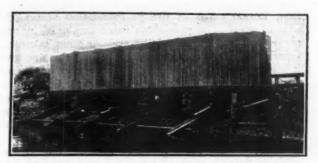
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The cassions differ materially from the usual structures of this type, as instead of being built extremely heavy, as has been the usual method, these are constructed with heavy steel working chamber and roof and the timber side sheeting is only heavy enough to stand the water pressure while handling and concreting the caissons. The concrete is of a rich mixture and heavily reinforced and carries the various stresses that such a structure is subjected to, whereas in the old type of caissons the extremely heavy timbering carried most of the stresses from handling and sinking.

The caissons were all built on shore, where they were constructed up to the top of the lower course, the roof plates and walls thoroughly caulked and launched on ship ways, floated, towed to position, moored to the old piers and sunk by concrete ballast until they took bearing on the bottom; after which they were undermined by orange peel buckets excavating through open steel wells 7 feet in diameter, five of which were provided for each of the large caissons and three for the small caisson. The mud flowed into the dredged pits sufficiently to permit the caissons to sink until they reached hard ground and cemented gravel, when it became necessary to continue the excavation by the pneumatic process.

Caisson No. 2 was sunk to hard stratum by open dredging in three days, and after conical reducers had been added to the tops of the 7-foot dredging shafts and surmounted by umbrella-type air locks, pneumatic pressure was applied and the caisson was sunk 7 feet farther through clay and 1 foot through cemented gravel by shifts of 25 sand hogs working in successive 8-hour shifts for 7 days. This excavation included the blasting of about 150 yards of rock and filling the working chamber with concrete

Caisson No. 1 was sunk about 12 feet by dredging in two days, and in eleven days under air pressure 12 sand hogs per 8-hour shift (3,168 man-hours) sunk it 5 feet through cemented gravel, 2 feet through hard mud, and 3 feet through soft rock under a maximum pressure of 18 pounds. The



CAISSON WITH TIMBER SIDE SHEETING IN PLACE.

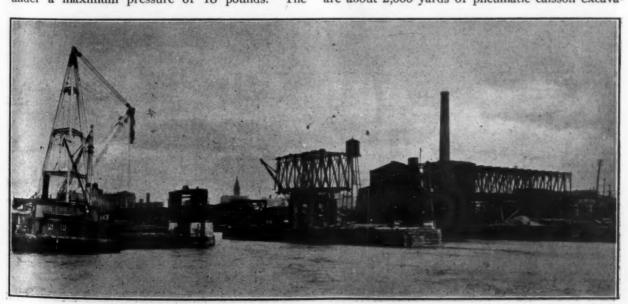
chamber was concreted in two shifts and was afterwards sealed by grouting.

All of the caissons were so thoroughly calked that they were almost absolutely watertight, and required no pumping. About 30 feet of concrete was filled in solid above the steel roof to sink the caisson to its required position, after which the upper section of the steel shaft was disconnected above the surface of the concrete and salvaged, forms were set up on top of the concrete and the remainder of the piers was concreted in the dry. It was expected that Pier No. 1 would be completed about July 1st and Pier No. 2 about July 15th.

The rock in the working chamber was drilled with 3 Ingersoll-Rand jack-hammer machines and was blasted with 60 percent dynamite.

The contractor was required to test the rock in each of the working chambers by taking out in Piers 1 and 4 two 3-inch cores each, and in Piers 2 and 3 six cores each, all of them eight feet long. Each core was made in about 5 hours by the Pennsylvania Drilling Company, which commenced operations in one part of the large caissons while excavating or concreting was going on in another portion of the same caisson. After removing the cores, 3-inch steel dowels, 12 feet long, were driven into each of the core holes, providing additional anchorage for the piers.

The principal amounts involved in the contract are about 2,000 yards of pneumatic caisson excava-



GENERAL VIEW OF SOUTH STREET BRIDGE, SHOWING OLD PIERS.

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tion, 12,000 yards of dredge excavation and 1,200 tons of steel. The maximum force employed by the contractor was 75 sand hogs and 90 other laborers. Operations were commenced early in February and it is expected that the steel erection can be begun August 1st. The contractors have a time limit of 18 months for the completion of the job, but according to the present indications, they are ahead of the schedule sufficiently to finish the work six months ahead of time.

The principal plant installed includes one Dravo whirler derrick with 12-ton, 76-foot boom installed in the material yard and for caisson building; one 33 x 90-foot derrick boat with Dravo whirler; one concrete boat with 60-foot hoisting tower; 20 and 40-yard sand and gravel bins; a 1-yard Ransome mixer, and a Dravo whirler derrick with a 76-foot boom; one Merritt-Chapman 75-ton floating derrick installed by the subcontractor for the steel work; a battery of 3 Dravo vertical steam boilers with a combined capacity of about 200-HP operating one 221/4 x 24-inch and one 161/4 x 18-inch Ingersoll-Rand straight-line air compressors with a combined capacity of about 2,000 cubic feet per minute; two 60-hp. Dravo vertical boilers on the mixer boat; three 3-drum Lambert steam hoisting engines for the whirler derricks; one set of diving gear; a complete equipment of pneumatic tools; 3 material locks, 1 man lock and 1 concrete lock; five 7-foot steel dredging well shafts made in 7-foot sections by the Dravo

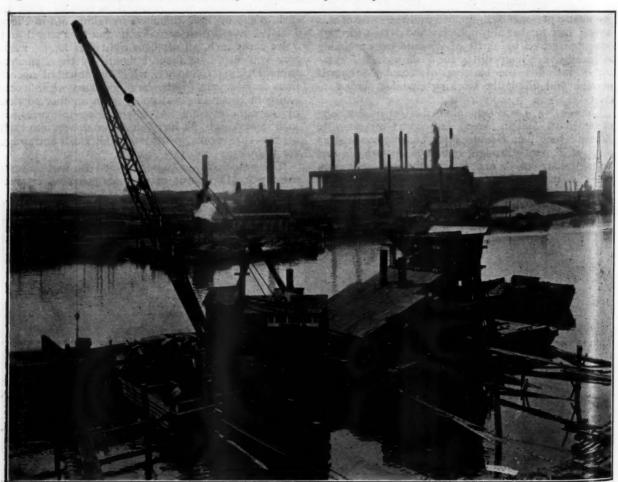
Contracting Company; 5 reducing sections for dredge shafts; 3 Heyward orange peel buckets, one 1-yard and one 15%-yard Williams clam shell bucket handling coal and aggregate.

The work was designed under the direction of S. N. Noyes, bridge engineer, Department of Public Works, Philadelphia, and the substructure work was executed under the direction of R. G. Stowell, superintendent for the Dravo Contracting Company.

Fifth Bates Road Test

The fifth test run on the Bates road saw the failure of several more sections under the load of 6,500 pounds on each rear wheel. At certain places the pavement was broken to such an extent that the trucks were unable to travel through them, and these were replaced by novaculite. Practically every one of the lighter sections have completely failed under this or previous runs, although the heaviest load was well under the legal load allowed in Illinois.

The sixth run is being made with 8,000 pounds on each of the rear wheels and 1;930 pounds on each front wheel, which is the legal limit for Illinois. It is proposed to continue this load for 10,000 applications so that a thorough test can be made of all the remaining sections. This run is expected to extend over six weeks as the maintenance of the sections in passable condition will undoubtedly present a complicated problem.



DERRICK BOAT WITH WHIRLER DERRICK AND CONCRETE MIXER

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The end of the fifth test saw the failure of the last section of the bituminous filled brick on macadam; three of the twelve sections of asphaltic concrete on cement concrete base; five of the thirteen of bituminous filled brick on cement concrete base; five of the seven of monolithic and semi-monolithic brick, and eleven of the twenty-seven cement concrete sections.

Most of the failures, however, had occurred during the earlier runs. The bituminous filled brick on macadam that failed in this run did so after the subgrade had been saturated, as had been done during the fourth run to the subgrade under a section of asphaltic concrete on macadam and under one of 4-inch concrete on a rolled stone base (see Public Works for July 8th). In addition to the complete failures a number of corner failures occurred during this run—7 in the asphaltic concrete pavement, 6 in bituminous filled brick on cement concrete, 3 in monolithic and semi-monolithic brick, and 10 in the cement concrete.

Baltimore Balancing Reservoir*

Constructed in Connection With the Raising of the Loch Raven Dam to Prevent Excessive Pressure on the Tunnel Connecting the Dam With the Purification Plant.

A so-called balancing reservoir has recently been completed in connection with the Gunpowder river improvements to the water supply of Baltimore. The reservoir was constructed as a means of limiting the pressure on the tunnel conducting water from the Gunpowder river to the city. The accompanying diagrammatic sketch shows the reservoir with respect to the other parts of the water works to which it is related.

A short description is necessary to explain the need for the reservoir.

The first Gunpowder works, which were completed in 1888, were composed of a low masonry dam across the river at Loch Raven, now known as the lower dam; Lake Montebello, and a tunnel 12 feet in diameter and 7 miles long from Loch Raven to Lake Montebello. The second Gunpowder works, which were completed in 1915 are composed of a low dam—now known as the upper dam—a filter plant, and a pumping station to raise water from the tunnel to the filters. With this new system of operation, the tunnel was subjected to an additional head of 17 feet, the difference in elevation between the upper and lower dams.

The upper dam has recently been raised from elevation 188 to elevation 240 above mean tide, and if the tunnel were strong enough to sustain the additional head, it would be possible now to supply the filters by gravity for most of the time and resort to pumping only when the water surface in Loch Raven reservoir dropped considerably below the crest of the dam.

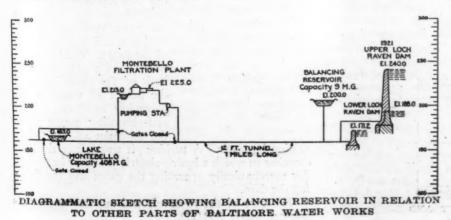
The tunnel is 12 feet in diameter. For about six miles from the city end it is deep below the ground surface in hard rock free of seams and is unlined, For the remainder of its length, about 6,000 feet, the tunnel is much shallower, passes through mica schist and seamy limestone and is lined with brick. Pressure tests were made on the tunnel by closing the gates at Loch Raven dam and allowing water to pass back into the tunnel. The tests proved that the head on the tunnel can not be much increased without endangering its safety and causing excessive leakage. The tunnel might be strengthened by lining it with concrete, but can be spared from service only four days at a time, and we estimate that three years would be required for lining it throughout, during which period of successive watering and unwatering, pressures throughout the low service zone would change with every change of operation. Further, the city has been faced with a water famine with every dry year, so filling the large impounding reservoir as soon as possible takes precedence over all other water works consideration, and the city may not wait for a tunnel lining.

An outlet was provided in the new Loch Raven gate house for an additional tunnel, which should be built when the operating costs of the increasing pumpage equal the carrying charges on a new tunnel.

As the tunnel can not be operated under much additional pressure, means of relieving the pressure to be imposed by the high dam had to be found. If the entrance of water into the tunnel could be exactly regulated, the head could be maintained at

that which the tunnel would stand; but the flow through the tunnel must vary from hour to hour with the fluctuating demands of the city, and the gate openings at Loch Raven cannot be adjusted to follow immediately the change in demand. Moreover, if a pump were thrown out of service, or the electric plant momentarily failed, throwing all the pumps out of service, pressure would rapidly build up in the tunnel.

^{*}Paper before Am. Water Works Ass'n by Wm. A. Megraw, water engineer, Baltimore.



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Water might be passed from the tunnel directly into Lake Montebello, thus avoiding increasing the pressure; but if this were done it would be necessary to discard the existing pumping station and install a new station on the shore of the lake to pump from the lake to the filters against a head fifty per cent higher than before.

It was noticed that water stood in an abandoned quarry, located approximately over the tunnel and about 4,300 feet from Loch Raven, which had been dry before the second Gunpowder works were built, and that the surface of this water rose when storm waters flowed over Loch Raven dam. The quarry occupied a natural depression in the hills, which might be converted into a reservoir by constructing a low dam and provide a water surface at elevation 200. This elevation would increase the head on the tunnel 8 feet and its carrying capacity to as much as the impounded river is estimated to furnish, and reduce the pumping head about one-fifth.

The function of a balancing reservoir is to supply the deficiency to the pumps when too little water is being admitted to the tunnel, and to absorb the excess when too much is being admitted.

The cost of the balancing reservoir was estimated to be about one-tenth that of a new pumping station. Plans were prepared and a contract was awarded to Thomas Mullen of Baltimore on September 10, 1921, for building the reservoir and appurtenances. All work was completed in April, 1922.

The reservoir is irregular in outline. The bottom is a natural clay overlying rock. The dam forming the closure in the hills is of earth taken from the bot-

tom and sides of the reservoir and rolled in six-inch layers. The inside slope of the dam is one on three and the outside slope one on two. The inside slope is lined with concrete slabs.

A vertical shaft through soft rock provides communication between the tunnel and reservoir. The shaft is 12 feet in diameter and is lined with reinforced concrete. Six 36-inch diameter flanged openings are arranged radially around the shaft, their inverts at elevation 190, which is the elevation of the reservoir bottom. The dam is at the opposite side from the shaft and as the original ground surface sloped away from the shaft toward the dam, it was necessary to regrade a portion of the bottom, in order that the entire contents of the reservoir may empty through the shaft into the tunnel.

The greatest depth of water is 10 feet, so the entire contents is available with small variation in head. The capacity is about nine million gallons.

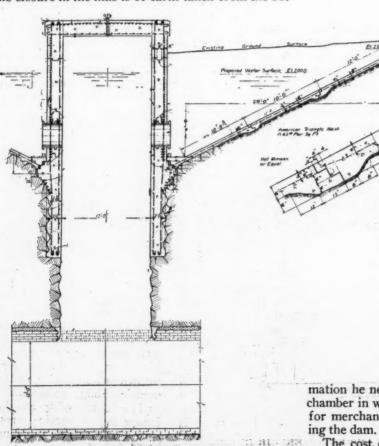
A concrete lined channel 20 feet wide at the bottom, having sloped sides, pierces a hillside beyond the dam to serve as a spillway.

The electric current feeding the pumping station is occasionally interrupted, whereupon the pumps run backwards and a shock is produced by the contact between the water moving forward in the tunnel and the water moving backwards from the filter plant. The contract provided for a second shaft 12 feet in diameter over the tunnel about 300 feet from the Montebello Pumping Station, with the top open and at elevation 201, to provide overflow and relief for the shock of surging waters.

On April 11, 1922, the relief openings in the new Loch Raven dam were closed, allowing the water to rise back of the dam. On May 6th the surface had risen to elevation 201, and gate regulation was then necessary to prevent water in the balancing reservoir wasting over the spillway. Gate regulation must continue until water overtops the Loch Raven dam, after which it probably will be desirable to set the gates, permitting a portion of the excess flow of the river to fall continuously over the spillway at the balancing reservoir, thus saving attendance and wear and tear of the gates. The height of water in the gate chamber back of the gates indicates the height of water in the balancing reservoir and a self-recording gauge gives the gateman all the infor-

mation he needs. A turbine pit was left in the gate chamber in which a hydro-electric unit may be placed, for merchanically operating the gates and for light-ing the dam

The cost of the reservoir and appartenances was approximately \$60,000.



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Public Works to Be Issued Monthly

In the future Public Works will be published as a monthly, the next issue appearing on August 15, and the date of issue thereafter being the 15th of each month. This involves no change in the policy of the paper, but is made because we believe that, with more time available between issues for collecting, digesting and editing, we can promise our readers a more comprehensive and valuable publication than has been possible with the weekly issues, although we do not feel that any apologies for these are called for. And with the larger monthly issues we can give in each one matter of value and interest in every branch of public works and appealing to each class of our readers.

The August number, in addition to articles dealing with other phases of public work, will feature the subject of sewerage and sewage disposal statistics, concerning which data are being collected from city engineers throughout the country. No information of this kind has been compiled by any one since 1915, when Municipal Journal (the former title of this paper) gathered and published it. Seven years have elapsed since then, and no doubt most engineers and other city officials will be particularly interested in was a fair proportion to ... atab daus

Reducing Cost and Time of Caisson Work

Caissons are necessary in excavating and concreting for a large amount of important substructure work both on land and water. Open caissons, which are essentially rigid vertical movable cofferdams, can be constructed much more easily, quickly and economically than equivalent pneumatic caissons, which are essentially diving bells and require slower, heavier and much more costly construction. Pneumatic caissons are often necessary for excavation in quicksand or in very hard or irregular or obstructed strata, while open caissons may be generally used in other cases.

Open caissons may be sunk much beyond the theoretical maximum depth for pneumatic caissons and the excavation in them is generally much more rapid and less costly. Concrete is also deposited in them more readily and cheaply than in pneumatic caissons and forms a mass monolithic with the superstructure, while in the pneumatic caisson, the body of the pier and its foundation are separated by the roof of the working chamber.

Often a large proportion of the excavation in open caissons can be made with mechanical plants such as dredging buckets, and in any event the work does not subject the men to the dangers always involved in work under pneumatic pressure.

When the open caisson cannot be unwatered and it is necessary to hand dress or inspect the bottom, it may be imperative to complete the excavation and execute part of the construction under pneumatic pressure. In such cases if all of the work is done with a pneumatic caisson it may be very slow and costly. The bulk of it, however, can be generally adapted to open caissons and can be done in the latter, while only a portion of the work, to complete the job, must be done in pneumatic caisson, thus providing a classification by which great saving of time and labor may be effected.

Within recent years this has been recognized in a number of important works by commencing excavation in open caissons that were designed to be eventually transformed into pneumatic caissons for the completion of the difficult portion of the work. This practice has been successfully carried out and practical features developed by the contractor for the substructure work described in this issue, who in this case built pneumatic caisson working chambers and surmounted them with open caissons and detachable cofferdams fitted with large-diameter open dredging wells through which the excavation was made with mechanical plant as far as the strata were suitable for this manner of sinking of the caissons; after which the dredging wells were closed, compressed air injected to expel the water from the working chamber, and the excavation was completed by the pneumatic process which was thus applied to only about 1/7 of the total excavation, obtaining the required final result much more quickly and cheaply than if all the work had been done by the pneumatic method.

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Careful investigation and planning will often enable work to be designed so that a large portion of the preliminary operations may be carried out by the cheaper method of open caissons and the small remaining part finished by converting the open into pneumatic caissons if necessary, although if the conditions prove favorable the pneumatic caissons may not be required at all and the work may be finished with the open caissons alone. Ordinarily, very little extra cost is involved in constructing an open caisson in such a manner that it may quickly be converted at need into a pneumatic caisson, and practically no extra cost is required for building a pneumatic caisson so that it may be used at first as an open or dredging caisson.

Acid Treatment of Wool-Scouring Waste Water

South African town uses the acid process to prevent clogging of filter beds at disposal plants, and reduces fats from 11,-430 parts per million to 75.

Considerable experimenting has been done in this country with acid treatment of sewage, especially that covered by the Miles patent; but in England it has been in actual use for a number of years. Apparently its use had not been adopted in its South African colonies, even for the direct treatment of factory wastes, until recently, to judge from a paper read before a meeting of the Institution of Municipal and County Engineers, held at Bloemfontein last month.

This paper was prepared by H. M. Ladell, town engineer of Wynberg, and the following synopsis of it is given by *Municipal Engineering and The Sanitary Record* of London, England.

Mr. Ladell stated that the problem of preventing damage to sewage plants by wool scouring liquor confronted him in 1919. In seeking a solution the only reference to the subject that he could find was in the reports of the Royal Commission on Sewage Disposal.

A large number of woolen manufacturers in England had soak and settling tanks, but in South Africa scarcely more than one such washery could be found in a town, so that the waste waters added little to the total sewage, and therefore it would not pay to put down works specially. On the other hand, the amount of fat in a single factory's untreated woolscouring waste would destroy the working of an ordinary sewage farm. Consequently it seemed preferable to treat the waste at the factory. One washery turned its waste direct into the sewers, with the result that inlet channels were clogged with grease and the filter-beds and land injuriously affected. The factory owners had improved the effluent. The Royal Commission held that in the great majority of cases it was practicable for manu-

facturers to purify the waste by reasonable preliminary measures, and suggested clarification down to 6 parts of suspended solids per 100,000. In the case under notice an attempt was made at inexpensive removal of detrimental fat, irrespective of revenue from the substances. Analysis showed that the sud contained as much as 1143.0 parts per 100,000 of total fats. All fatty matters were classed as "free" or "combined," the first being traceable in alkaline effluent, the other in the acidified residual. Some change appeared to take place in the sewers, the effluent at the factory showing more free fat, whereas at the disposal works it showed more combined fat, possibly due to the formation of some weak acid and resultant decomposition. Therefore both must be dealt with effectively.

Wool scouring was usually done in three bowls, the wool being mechanically passed through each. Then it was rinsed in a fourth bowl, the water of which was not considered as containing fatty matter until analysis at Wynberg revealed 9.12 and 7.16 parts per 100,000 of total fats in it. Experiments showed the necessity of determining temperature of sud when adding acid, quantity of acid added, and temperature at skimming.

The sud was run off from the bowls into a collecting tank, then run or pumped into the "acid" tank, where acid was added. The sud, which was warm on leaving the bowls, should not be allowed to cool, otherwise the addition of acid caused sulphuretted hydrogen. The average period in the acid tank approached twenty-four hours; therefore the capacity of acid tanks should be equal to three times the daily flow. Before adding the acid the heat of the sud was increased by steam to 120 deg. Fah. The acid quantity was about 1 gallon of acid to 250 gallons of sud. The sud and acid should be thoroughly mixed and left to cool, when the fatty matters will rise to the surface and could be skimmed off. Skimming was a very important part of the operation and needed careful attention. Skimming by hand with a small scoop was the common method, but this was crude and liable to be inefficiently carried out. The draw-off from both acid and lime tanks should be by "floating" arms, so arranged as not to allow either the top or bottom layers of water to be taken, as both these generally contain fatty and solid matters. Careful working had shown that it is quite easy to reduce the "free" fats in the final effluent to 2 parts per 100,000 and the "combined" fats to 51/2 parts or a total of 71/2, and this is the maximum at present allowed. In each of the three tanks, i. e., collecting, acid and lime tanks, a considerable quantity of sludge will be deposited. That in the collecting and acid tanks should be removed

after each time these are used.

Outlets from all bowls or places where any washing of wool takes place should be so constructed that the whole of the water used must run into the collecting tank. There should be no outlet from the collecting tank except through the acid tank, and no outlet from the acid tank save through the lime tank, except in each case for sludge. The sets of tanks should be at least in duplicate. It was most difficult, if not impossible, to find any records of analyses of sewage showing the "fat" contents, and one could not judge what was a fair proportion to allow for.

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Wood Water Mains

Advantages and disadvantages discussed by engineer of extensive experience, who compares wood and cast iron from points of view of life, serviceability and cost, concluding that where conditions are suitable for it wood is the more economical.

Wood was the first material used for water mains in this country and it is still used to a considerable extent, but cast iron has superseded it as the standard material for such service. In view of the fact that wooden water mains have been found in good condition after having been for a century or more in the ground and that such mains are considerably cheaper than cast iron in most localities, some engineers have naturally wondered why they have not come into more general use. A quite exhaustive and apparently unbiased discussion of wood water pipe was presented to the American Water Works Association at its latest convention by J. W. Ledoux, in which he makes a comparison between wood and cast iron pipe.

He states that cast iron pipe will last at least 100 years while the average life of wood pipe is not more than 25 years. "There are many modern wood pipes that have been giving good service much longer than 25 years, but when we compare it with cast iron it is best to assume the short life with the wood pipe." He then takes for comparison a line of 24-inch continuous redwood pipe. The discharging capacity he considers to be 20% greater than that of cast iron of the same size. According to the assumed life, the wood pipe would have to be renewed four times during the 100 years and cast iron not at all. Assuming 65 pounds working pressure, the initial cost of 10,000 feet of wood pipe would be \$41,900 and of cast iron pipe \$67,000 or, to obtain the same capacity, a larger cast iron pipe would be used costing \$74,050. He assumes the cost of repairs to the wood pipe at 1% per annum and of cast iron pipe at 0.25% and the taxes in each case as .6%; giving the annual charge for wood pipe \$670 and for cast iron pape \$630. He compares the two pipes on the basis of present worth and gives the present worth of \$41,900 at 5% for renewal in 25 years as \$12,373, the same for renewal again in 50 years as \$3,654, the same for renewal again in 75 years as \$1,079 and for renewal in 100 years as \$319. Also the present worth of the \$670 annual charges for 100 years at 5% is \$13,400. The present worth of the \$630 annual charges for the cost iron pipe for 100 years amounts to \$12,600. Adding to these the initial costs of \$41,900 for wood pipe and \$74,050 for cast iron pipe gives the total present worths of \$72,725 for wood pipe and \$86,650 for cast iron This shows a saving of nearly 19% in the use of wood pipe over the cost of cast iron pipe on the basis of present worths.

Making another calculation on the use of machine banded eastern pine wood, with an initial cost of \$28,900, he obtains present worth figures of \$50,125 for the wood pipe and \$86,650 for the cast iron, a saving of \$36,525. For larger sizes of pipe the difference would be greater, and for smaller sizes it would be less. For 12-inch machine banded eastern pipe the initial cost would be \$14,600 as against \$26,900 for cast iron pipe, or \$29,070 to obtain the 20% greater capacity of the wood pipe. Calculating in the same way as above he obtains present worth of \$25,847 for the wood and \$34,027 for the cast iron.

"When a financial comparison on a rational basis shows such a material advantage of wood over cast iron pipe, the question naturally arises, why is cast iron so universally preferred by most of the leading engineers? It is, no doubt, because there have been so many unfortunate experiences with wood pipe. Successful installations cause only the same effect on engineering sentiment as does a moral scandal on that of the public; successes are forgotten and the failures vividly remembered.

Then again, cast iron pipe is suitable for nearly all situations and conditions of operation under the widest range of pressure and flow, and even in the circumstances of distribution mains where the carrying capacity is reduced as much as 75%, its reputation for reliability and ruggedness is not destroyed the owners comforting themselves, where they happen to know about it, with the feeling that they can always restore the capacity by cleaning. On the other hand, there are frequently conditions that would give no trouble with cast iron pipe where wood pipe would be entirely unsatisfactory. It must be admitted that most of the wood pipe companies are coming more to realize these facts, and of late years refuse to furnish pipe where the conditions are unfavorable. Wood pipe is sometimes shipped before needed and left out exposed to harmful weather conditions, causing warping and permitting dirt to get into the stave joints. In some important installations, sap and knotty wood has been used which adds further to its discredit.'

Mr. Ledoux believes that the maximum working pressure should be limited to 150 pounds per square inch or possibly 200 pounds. The steel bands should not be subjected to a greater stress than 15,000 pounds per square inch at the weakest section, nor the wood to an external pressure caused by the bands greater than 750 pounds per square inch, or preferably 500 pounds when the round rod has a bearing surface on the wood not to exceed the radius of the rod.

The wood used may be red wood, fir, white pine, Norway pine or cypress, thoroughly seasoned and air-dried before working into staves; free from loose or black knots or any knots that pass more than half way through the wood, from sap wood, wind shakes, check cracks, dry rot, pitch pockets or pitch seams. Pipes or staves should be stored in a dry place until they are ready to be laid.

For a machine spirally banded pipe, the gage

of the steel should not be less in thickness than No. 14 B. G. W. except for low pressures. For pipe with diameters of 8 inches and below, No. 18 gage may be permitted.

After the pipe has been laid, a test for leakage should be made under the working pressure and this should not exceed 700 gallons per 24 hours for each inch of diameter of pipe per mile.

Mr. Ledoux recommends that in calculating the carrying capacity of wood pipe the value of C in the Chesey formula be taken at 110, although the capacity may be greater in many cases.

CONDITIONS FAVORING WOOD PIPE

Summing up the conditions under which wood pipe may profitably be used, the author believes that the ideal condition for wood pipe is where it is to be subjected constantly to pressure from an elevated reservoir and never allowed to become empty except temporarily for repairs or emergency. It may not be seriously objectiona-ble to have a pipe empty occasionally for even a week at a time if it is covered up in a trench; but where it is exposed in the open air it should be kept constantly full of water under material

Wood pipe should never be laid in cinder-fill ground or in places where mine water could reach the bands, for under these conditions the bands are almost sure to rust and break within a very short time. The same, however, would be equally applicable to steel pipe or cast iron pipe.

Mr. Ledoux states that probably more than 500 miles of wood pipe is installed each year and that more than 500 municipalities and water companies in the United States are making use of it. The sizes range from 4 inches to 60 inches and their pressures up to 150 pounds. Some of the companies sell quite a little creosoted pipe, and creosoting probably doubles the life of the wood, but in the majority of situations the life of the pipe is dependent upon that of the steel rods and bands rather than the wood.

In discussing some of the characteristics of wood pipe, the author states that one reason why a great deal of trouble is experienced with leakage in large wooden pipes is that, when the pipe is laid in a trench with considerable fill over it and the pressure is low, the pipe will assume an oblate form, the vertical diameter being materially less than the horizontal. If the pressure is increased materially, the pipe becomes more nearly circular in form and the joints between the staves become less tight with this change of form. The remedy is to constantly operate this class of pipe under fairly uniform pressures.

The author gives in his paper quite full formulas, tables and data for calculating the thickness of wood staves, diameters of round or dimensions of flat rods to be used, spacing between centers of rods, etc., for each size of pipe and for pressures varying from 25 pounds to 150 pounds. He also gives calculations for water hammer and discusses the carrying capacity of wood pipe.

Altogether the paper is perhaps the most com-plete discussion of the subject of wood pipe from the engineer's point of view that has yet appeared.

Operating Sewage Treatment Plants

We have from time to time called attention to the importance of faithfully and properly operating sewage treatment plants and have published one or two sets of instructions prepared by state health boards. The following "guide," prepared by Burns & McDonnell Engineering Company, is briefer than some others, but probably touches all the points that it is necessary to bring to the attention of municipal authorities, for whom it is intended. In fact, its brevity is undoubtedly an advantage for such pur-

As the authors say: "No guide to the operation of treatment plants can cover all cases and at times unforeseen problems may arise due to a period of neglect or to local conditions which cannot be solved by the regular operator. At such times expert advice will be required and cities should confer with consulting engineers or the Sanitary engineer of the State Board of Health. The employment of engineers to advise concerning operation of plants and closer co-operation with State Boards of Health woud go far toward transforming many well-designed plants from a state of neglect to one of efficient operation."

NATURE OF SEWAGE

Great variation in quantity and quality of sewage exists in different cities, due to entrance of seepage water, roof water, and industrial wastes into the sewers. For economical and efficient operation of a treatment plant it is desirable that a minimum of seepage and no roof water be allowed to enter. Fresh sewage is desired for Imhoff tank treatment. Some industrial wastes, such as tar and oil from gas plants and refineries and washings from garages are particularly troublesome; stringent regulations should be enforced by cities to prevent such wastes from reaching the sewers to keep their treatment plants operating efficiently.

BY-PASSES

No raw sewage should be by-passed except when absolutely necessary.

GRIT CHAMBERS

Screens should be cleaned at least once per day and more often if necessary.

Grit chambers should be cleaned out whenever the accumulation of grit becomes such that grit tends to wash through; removed contents should be buried, or dried on sludge bed.

SEPTIC TANKS

Inlet and outlet channels and weirs should be kept clean.

Sewage solids will accumulate as settled sludge or floating scum; contents of tank should be dis-turbed as little as possible. When combined depth of scum and sludge equals one-quarter of the tank depth, the solids should be removed, preferably in spring or fall, when sludge will dry quickly

Removed material may be buried, or dried on sand

beds. No open flame lamps should be taken into any septic tank on account of the explosive character of accumulated gases.

IMHOFF TANKS

Channels.-All channels should be cleaned at frequent intervals and always before reversal of flow, using care that deposits are not washed into tanks.

Settling Chambers.—When putting Imhoff tanks into service for the first time, or after pumping out and cleaning, if sewage is concentrated and flow heavy, the tanks should be filled with the more dilute night flow or clear water and the amount of sewage admitted to the tanks gradually increased, in order to build up the bacterial action.

Non-settleable material, such as oil and grease, should be skimmed off daily, burying or burning it.

Settleable material behind baffles and scum on surface of setting chambers should be skimmed off daily, throwing it into gas vents.

All vertical walls and sloping bottoms of settling chambers should be cleaned with rubber squeegees slowly, forcing the deposit entirely through the slot, taking care that the deposit is not stirred up and carried into outlet.

When reversing channels are provided the flow through the tanks should be reversed every week or two, previously skimming off all floating materials behind inlet baffles and squeegeeing all wall surfaces between baffle and end wall at inlet and allowing time for settlement.

Gas Vents.—The scum in the gas vents should be broken up daily by sprinkling with water or agitating with a rake to release the entrained gases and any material which cannot be made to settle should be removed and buried or burned.

If foaming occurs and cannot be controlled, the City should advise with its consulting engineer or the sanitary engineer of the State Board of Health.

Sludge Chamber.—Sludge should not be allowed to accumulate nearer than eighteen inches to the slot at the bottom of the settling chamber. The surface of the sludge may be determined by means of a wood or sheet iron plate attached to a wire or light

Sludge should be removed at intervals by opening valves slowly on sludge pipes, it being better to remove small amounts frequently than large amounts infrequently.

Sludge should be drawn off slowly to allow continuous settlement of sludge around base of sludge pipe; only well-digested sludge should be withdrawn, known by its brownish-black color, more or less granular and frothy appearance, and faint tarry or rubbery odor as opposed to the grayish color, sticky and pasty appearance and foul odor of partly digested sludge.

Late each fall the entire amount of digested sludge should be withdrawn to provide sufficient storage capacity for winter sludge.

Vertical and horizontal sludge pipes should be cleaned by rodding to break up old deposits before opening valves. The sludge pipe may be backfilled with water or settled sewage after drawing sludge.

At intervals of several years, dependent upon local conditions and kind of plant operation, the tanks may require to be pumped out and cleaned out thoroughly. financial loss to the city.

SLUDGE BEDS

Sludge should not be drawn upon the bed until all dried sludge has been removed therefrom; welldigested sludge only should be dried upon the bed and should be drawn to a depth preferably not over six to eight inches and never over twelve inches.

When thoroughly dried the sludge should be removed, being careful to remove as little filter sand as possible, and may be used for filling in low places without nuisance, or for lightening and furnishing humus to heavy soils.

Thin layers of sand should be applied to the bed from time to time to compensate for losses during removal of sludge.

DOSING CHAMBER

Before starting, the siphon should be filled with water and all pipe connections to the siphon should be kept continuously airtight.

The sides and bottom of the dosing chamber should be cleaned down occasionally, and all floating material should be skimmed off frequently.

SPRINKLING FILTERS

Sprinkling nozzles should be examined daily and kept clean.

The surface of the stone should be kept free from

leaves, papers, and vegetable growth. In case organic growth in the bed and moth-flies

with their larvae become troublesome, chemicals such as caustic soda, copper sulphate or hypochlorite of lime may be used in proper quantities for their con-

FINAL SETTLING TANK

The sludge should be removed frequently so that it will not become septic.

CONTACT FILTERS

The apparatus for filling and emptying the beds should be examined frequently and kept in perfect operation.

The surface of the stone should be kept free from foreign material and vegetable growth.

When the stone becomes clogged with sewage solids, at intervals of five years, more or less, the entire bed of stone will require to be removed, washed, screened and replaced.

SAND FILTERS

Sand beds should be dosed alternately to allow cleaning, resting and drying. The distributors should be regulated to secure even distribution of

Before dosing, any accumulated sludge should be removed and the bed raked lightly to a depth of one-half inch to break the surface.

When the bed becomes clogged so that sewage will not percolate, the surface sand should be scraped off to a depth of one inch and raked. At longer intervals new sand of suitable quality must be added to the bed.

Teams and heavy loads should not be driven over the bed. Holes should not be dug into the sand to pass sewage directly to drains and any wash-ins should be repaired at once. No growth of vegetation should be allowed on the bed.

In the northern states the sand should be piled or ridged in late fall for winter operation to prevent ice from freezing to the sand, and every opportunity utilized for cleaning the bed. bus the

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Recent Legal Decisions

TEMPORARY INJUNCTION REFUSED AGAINST MUNICIPAL CONTRACT ALLEGED TO BE IN VIOLATION OF CHARTER

In an action to restrain a municipal corporation from entering into a contract with a public utility company for the supply of electric energy for the village, alleged to be in violation of the competitive provisions of the village charter, and to work an abandonment of an existing municipal lighting plant, without a vote of the taxpayers as required by the Minnesota statute, the Minnesota Supreme Court holds, Wagner v. Cramer, 188 N. W. 65, that the trial court did not abuse its discretion in denying a motion for a temporary injunction restraining proceedings pending the action. The village plant had become a burden, owing to the high price of coal and labor, and was being operated at a loss, and the council's object was to pave the way, should the temporary experiment result economically to the village, for abandonment of the village plant.

STATE NOT LIABLE FOR DELAYS PRIOR TO ITS EXECUTION OF HIGHWAY CONTRACT

Section 130 of the New York Highway Law provides that the execution of a formal written contract after its approval by the Comptroller is essential to establish liability of the state for any delays prior to its execution, however inequitable the state's conduct may have been. A contractor who had been awarded a contract for the improvement of a state highway executed the contract on his part and filed the required bond. His papers appeared satisfactory to the commissioner of highways, who, however, so delayed execution of the contract on the part of the state that it was impossible to complete the work before winter, and, by mutual consent, its commencement was postponed until the following spring. The work was then begun and completed, but, because of the increased cost of labor and materials, the expense was greater than if it had been done during the preceding fall. The New York Court of Appeals held, Belmar Contracting Co. v. State, 233 N. Y. 189, 135 N. E. 240, that the contractor could not recover his damage from the state. The unexcused failure of the comptroller to approve of the contract was held a personal fault for which the state was not liable. The only remedy the contractor would have had for nonexecution of the contract within a reasonable time was to withdraw its bid and recover its deposit.

CONDEMNATION OF LAND FOR PUBLIC PARKS

The Ohio Supreme Court holds, Nichols v. City of Cleveland, 135 N. E. 291, that where one entire plan has been adopted for a public improvement, and from the inception a certain tract of land has been actually included therein, the owner of such tract in a condemnation proceeding therefor is not entitled to an increased value which may result from the improvement, where its appropriation is a condition precedent to the existence of the improvement. It is also held that the public and abutting owners do not have such vested rights in the walks and driveways which are laid out and improved as part of a public

park as will preclude the park authorities from relocating the same whenever and in such manner as they may deem best suited to the purposes of the park.

CHANGE IN ROUTE OF PIPE LINE HELD NOT TO RELIEVE CONTRACTOR'S SURETY

A change in the route of a pipe line due to difficulty in obtaining rights of way involving an increase in length of about 877 feet, the total length of the line being 3,800 feet, is held to come within the language of a construction contract authorizing chances deemed necessary in the opinion of the engineer for the betterment of the work, and is not such a change as will relieve a surety company guaranteeing the faithful performance of the contract.—Village of Newark v. James F. Leary Const. Co., 194 N. Y. Supp. 212.

TEXAS MUNICIPALITY SUPPLYING WATER CANNOT REFUSE TO SUPPLY TE NANT OF PART OF A BUILDING OR MAKE OWNER ASSUME TENANTS LIABILITY

As a general rule, the obligations to the consumer of a municipality operating a water supply are the same as those of a private corporation engaged in such business. It is the duty of the organization supplying the water to supply it impartially to all reasonably within the reach of its pipes and mains. This service must be given without discrimination between the persons similarly situated or under circumstances substantially the same. Water must be furnished to all who apply therefor, offer to pay the rates, and abide by such reasonable rules and regulations as may be made a condition of rendering The company or the city cannot escape from its duty to furnish an applicant on demand, merely because he is already in receipt of a supply indirectly through the medium of another. owner or occupant of a building has the right to deal directly with the city for his supply of water. Applying these principles, the Texas Supreme Court holds, City of Galveston v. Kenner, 240 S. W. 894, that an ordinance of a city operating its own water supply system having the effect of denying to a tenant the right to water unless he is in possession of the entire building, and denying the right to erect buildings for rental unless the owner assumes the obligation of paying the tenants' water rents, is unreasonable and void.

SALE OF STREET IMPROVEMENT BONDS ON CREDIT HELD INVALID

The Tennessee Supreme Court holds, Reed v. Mayor and Aldermen of City of Athens, 240 S. W. 439, that the sale of street improvement bonds, permitting the purchaser to retain the proceeds without security to the city, and to pay the city only as the work progressed, was invalid, the arrangement amounting to an extension of personal credit by the city to the purchaser, for the full consideration to be paid by him, if he should decide not to pay any part of the consideration in cash. Such an arrangement, if permitted, might, the court said, result in heavy financial loss to the city.

NEWS OF THE SOCIETIES

CALENDAR

Aug. 8-10—UNION OF CANADIAN MUNICIPALITIES. Annual convention, Winnipeg, Man. Secretary, A. D. Shibley, 10 St. John St., Montreal.

Aug. 15-17—LEAGUE OF IOWA MUNICIPALITIES. Annual meeting. Secretary, F. G. Pierce, Marshalltown, Ia.

Aug. 15-18—INTERNATIONAL AS-SOCIATION OF FIRE ENGINEERS. Fiftieth convention. Municipal Audi-torium, San Francisco, Cal. Secretary, James J. Mulcahey, Chief, Yonkers, N. Y., Fire Dept.

N. Y., Fire Dept.

Aug. 19-26—AMERICAN INSTITUTE
OF PARK EXECUTIVES. Annual convention, Minneapolis, Minn. Secretary,
Emmett Griffin, Supt. of Parks, East
St Ladde 111

Emmett Grimn, Supt. of Parks, East St. Least, Ill.

Aug. 22-25—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, New Bedford, Mass. Secretary, Clarence R. George, City Electrician, Houston, Tex. Aug. 28-Sept. 2-NATIONAL SAFE-TY CONGRESS. Detroit, Mich.

Aug. 29-30-31—LEAGUE OF CITIES OF THE THIRD CLASS IN PENNSYL-VANIA. Annual convention, Williamsport, Pa. Fred H. Gates, Secretary, Wilkes-Barre, Pa.

Sept. 11-15—ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGI-NEERS. New Auditorium, Cleveland,

Sept. 12-15—NEW ENGLAND WATER WORKS ASSOCIATION. 41st annual convention. New Bedford, Mass. Secretary, Frank J. Gifford, Tremont Temple, Boston, Mass.

Sept. 14-16—AMERICAN ASSOCIA-TION OF PORT AUTHORITIES. Con-vention at Toronto. Secretary, M. P. Fennell, Jr., Montreal.

Sept. 19-23—LEAGUE OF CALIFOR-NIA MUNICIPALITIES. Annual con-vention, Palo Alto, Cal. Executive sec-retary, W. J. Locke, Pacific Bldg., San Francisco.

Sept. 25-28—SOUTHWEST WATER WORKS ASSOCIATION. Annual convention, Hot Springs, Ark. Secretary, E. L. Fulkerson, Waco, Tex.

Oct. 1-6—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Cleveland, Ohio. Secretary, Charles C. Brown, St. Petersburg, Fla.

municipal improvements. Annual convention, Cleveland, Ohio. Secretary, Charles C. Brown, St. Petersburg, Fla. Oct. 16-19 — AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, Chicago, Ill. Secretary, A. W. Hedrick, 370 Seventh Ave., New York, N. Y.

Nov. 15-16—NATIONAL INDUSTRIAL LEAGUE. Annual meeting. New York City. Secretary, J. H. Beck, Chicago.

Dec. 7-13—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING. New York City.

AMERICAN ASSOCIATION OF ENGINEERS' NOTES

The Board of Directors of the American Association of Engineers has voted to accept the invitation to become a member of the American Construction Council.

The Richmond Chapter on July 5th gave a dinner to H. G. Shirley in honor of his appointment as chairman of the Virginia State Highway Commission, at which were present as guests Governor Trinkle, Mayor Ainslie of Richmond, Attorney-General Saunders and officers of the leading civic and professional clubs of the city.

The Seattle Chapter recently sponsored a public meeting at which Fred A. Adams, supervisor and educational director of the Columbia Basin project, and Ivan E. Goodner, chief engineer, explained the huge irrigation plans.

ENGINEERS' SOCIETY OF MILWAUKEE

This society has elected the following officers for the coming year: President, Arthur Simon, engineer of the Cutler-Hammer Manufacturing Co.; vice-president, Fred H. Dorner, mechanical engineer; treasurer, A. Q. Dufour, mechanical engineer, and secretary, Fred T. Goes, engineer of the Vilter Manufacturing Co.

Following the election of officers Mr. Dorner was presented with a gold watch in appreciation of his services as secretary of the society for the past ten years.

AMERICAN ASSOCIATION OF PORT

The eleventh annual convention of the American Association of Port Authorities is to be held in Toronto, Ont., Sept. 14 to 16, 1922. The convention will be followed by an excursion down the St. Lawrence river to Montreal and then to Quebec, at both of which cities the port facilities will be inspected under the auspices of the local authorities. The secretary of the association is M. P. Fennell, Jr., of the Port of Montreal.

SOUTH APPALACHIAN WATER POWER CONFERENCE

Hydraulic engineers in the south have organized an association to be known by the above name, electing as president Col. Joseph Hyde Pratt, director of the North Carolina Geological and Economic Survey; Lincoln Green, first vice-president of the Southern R. R. as vice-president; Prof. J. A. Switser, of Tennessee, as secretary; and Thorndike Saville, chief of the Division of Water Resources of the North Carolina Geological and Economic Survey, as treasurer.

The Federal government was represented by N. C. Grover, chief hydraulic engineer of the U.S. Geological Survey; O. C. Merrill, executive secretary of the Federal Power Commission; C. H. Birdseye, chief topographer of the U. S. Geological Survey; C. V. Hodgson, of the U. S. Coast and Geodetic Survey; T. W. Norcross, chief engineer of the U. S. Forest Service; Col. H. B. Ferguson, assistant secretary of war; and Warren E. Hall, district engineer, U. S. Geological Survey.

Most of the leading hydraulic engineers of the south were present. Papers were presented discussing water power development in the

southern states, and several committees were appointed. One of these committees, on Energy Supply, will study location of undeveloped water powers in the southern Appalachian states, the order of development, the location of auxiliary steam plants, making of water-power surveys, taking of stream-flow measurements, the problem of silting, etc. Another will treat of inter-connection of the various power developments, and a third will consider proper Federal and state legislation to aid in water-power develop-

PERSONALS

Phillips, Harry W., has been appointed superintendent of construction for the city of Davenport, Iowa.

Taylor, Thomas, for the past 10 years designing and constructing engineer for the Department of Works of Toronto, Ontario, has been promoted to the posi-tion of engineer of railways and bridges of that department.

Strouse, William F., has resigned as chief engineer of the Public Service Commission of Maryland and will be succeeded by H. Carl Wolf, now engineer of public utilities for the commission. Mr. Strouse, as valuation engineer, will continue to be a member of the commission's engineering staff.

Blauvelt, Major L. D., has resigned as state highway engineer of Colorado, to become chief construction engineer for the Moffat Tunnel Commission, Denver, Colorado, which will construct a 6-mile railroad tunnel through the Continental Divide.

Godward, A. C., engineer for the Minneapolis Board of Park Commissioners, has been appointed engineer for the recently created Minneapolis City Planning Commission.

Ford, Frederick L., city engineer of New Haven, Conn., has been appointed by Governor Lake one of six members of a commission from that state which, with similar commissions from the other New England states, wll work out a plan for consolidating New England's railroads into one compact system.

Perron, J. L., has been appointed min-ister of roads for the Province of Quebec, Joseph Boulanger will replace B. Michaud as deputy minister and G. Henry, formerly chief engineer of the department will act as consulting engi-

Russell, Captain A. L., civil engineer and Dominion land surveyor, formerly of Port Arthur, Ontario, Canada, died June 11 in Ottawa, aged 80 years.

Waud, Joseph B., for many years surveyor and engineer for Ventura County,

California, died June 1. de Ruiz, Captain Albert, for 12 years city engineer of Long Beach, California, died at his home in that city on May 29, aged 69 years.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

SMITH EXCAVATOR AND LOADER

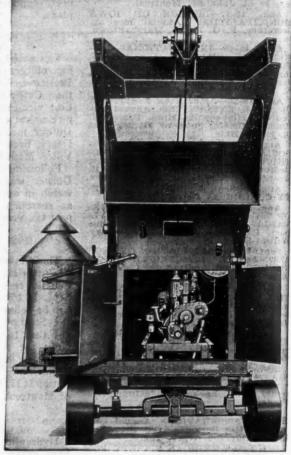
The Wisconsin four-cylinder gasoline engine used on Smith Pavers has also been adopted for excavators and loaders, made by the T. L. Smith Company. The new motor has 3-inch bore and 5-inch stroke and runs at 1,200 R. P. M. It provides about 40 percent. additional power over the previous equipment. A recent installation of this new-motored machine is shown in the accompanying illustration, where the excavator and loader is shown excavating and loading gravel from a gravel pit. The loaded scraper is brought to the excavator and dumped directly into the waiting truck.

These machines are used for general drag-line excavating, for digging basements and loading dierctly into wagons or trucks on the surface; for grading, stripping and miscellaneous earth handling and loading.

tubes of the same bore and thickness, 20cc. standardized indicator solution and one 0.5cc. graduated pipette for measuring indicator. Color tubes and corresponding indicator solution can be supplied covering any portion of the range pH. 1.0 to 10.0 in consecutive integers of 0.2 pH. Phenol Red tubes are usually supplied since they cover the range encountered in ordinary work, but other standards may be obtained upon specification.

PARKER-LAWYER CO.

Frederick J. Parker, formerly secretary of the Arthur McMullen Com-



END VIEW OF SMITH EXC AVATOR AND LOADER, SHOWING NEW MOTOR



SMITH EXCAVATOR AND LOADER ON GRAVEL PIT WORK

THE LAMOTTE HYDROGEN-ION COMPARATOR SET

This is a portable outfit for the Colorimetric study of the Hydrogen-Ion concentration of liquids and solutions, made by the LaMotte Chemical

Products Company. The set embodies all the conveniences possible in a portable outfit, and enables direct determinations of H-ion concentrations to be made either in the field, at the station, or in the boiler house, without additional equipment. The whole outfit may be carried at ease as all reagents and equipment are contained in a polished wooden case approximately 5 inches long, 6 inches high and 2 inches thick. The case serves as a combined comparator block and tube rack, and permits the viewing of three double rows of tubes simultaneously. Within the case are ten standard color tubes of 15mm. diameter, two extra graduated test

pany, announces the severance of that connection and the formation of the general contracting organizations of the Parker-Sawyer Company, railroad and general construction, and of the Engineering Construction Corporation, highway contractors, with offices at 720 Commercial Trust Building, Philadelphia.

INDUSTRIAL NOTES

National Tube Company has opened new offices in the Empire Building, 71 Broadway, New York City, with Clifton Wharton, Jr. as manager.

The Fulton Company, manufacturers of heating specialties, Knoxville, Tenn., has recently been organized. The new officers are: W. M. Fulton, President and Treasurer; Warren Webster, Vice-President; C. N. Mynderse, Executive Manager; Henry Hudson, Secretary.

CONTINUOUS EXCAVATION AND REMOVAL OF DIRT.

b C I

A bulletin issued by the Holt Mfg. Co., Inc., illustrates the use of Holt Caterpillar tractors of 5 and 10 tons capacity each for hauling trains of dump wagons and excavating grader machine respectively at speeds varying from 1.5 to 5.7 miles per hour for forward and reverse on very heavy to light work and in moving from place to place. The 10ton caterpillar can easily handle the largest grading machine or haul two 5yard dump wagons replacing 12 teams and 12 skinners. The caterpillars are adapted to frequent stopping and starting and can turn in very short radius. Their use enables the work to take place continuously at a speed that insures a very large amount of excavation in a short time.

Peterson, Shirley & Gunther, contractors, Omaha, have installed 18 Holt caterpillar tractors on their work. lo. 5

Advance Contract News

ADVANCE INFORMATION

ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STREETS AND ROADS

Ala., Guntersville
For widening 4 mi. sts., \$50,000.—R.
L. Totten, Engr., Birmingham.
Can., Quebec
For grav. 16 mi., also 38,252 ft. hwy.
—M. Necktar, Engr. Dept. Rds.
Ga., Atlanta
For constr. viaduct.—J. N. Landers,
Dur Agent.

For constr. viaduct.—J. N. Landers, Pur. Agent.

Ind., Bloomdeld 2 p.m., Aug. 8
For const. 2 macadamized roads.—
Herschel Corbin, Co. Aud.
Ind., Bloomington 2 p.m., Aug. 8
For grad., drain. and pav. road.—
County Commissioners, Court House.
Ind., Indianapolis 2 p.m., Aug. 2
For grad. and pav. sev. streets.—Bd.
Public Works.
Ind., Indianapolis 2 p.m., Aug. 7
For grad. and pav. sev. streets.—Bd.
Board of Public Works.
Ind., Indianapolis 10 a.m., Aug. 8
For constr. 3.260 and 8.877 mi. State
Hwy.—J. D. Williams, Dir. State Hwy.
Com.

Com.
Ind., Jeffersonville
For grad., drain. and pav. 9,343 ft.
road.—T. I. Stoner, Co. Aud.
Ind., Logansport
For constr. gravel road, est. \$14,791.—
H. M. Gardner, Co. Aud.
Ind., Newport
Prograd., drain. and pav. 1¼ mi.
hwy.—M. Lewis, Co. Aud.
Ind., Peru
For grad., drain., pav., culvert and bridge work on hwy.—Charles Wolf, Co. Auditor.
Ind., Princeton
For constr. 14,807.5, 2,349, 9,772, 15,-

Co. Auditor.

Ind., Princeton
For constr. 14,807.5, 2,349, 9,772, 15,748, 13,604 and 1,200 ft. of county roads.
—A. M. Johnson, Co. Aud.
Ind., Rockville
For grad., drain. and pav. 3,090 ft. of hwy.—R. E. Porter, Co. Aud.
Ind., Shelbyville
10 a.m., Aug. 9
For grad., drain. and pav. hwy.—Walter W. Leslie, Co. Aud.
Ind., Tipton
For grad., drain. and pav. hwy.—C. Grishaw, Co. Aud.
Kan., Fredonia
For constr. 1.306 mi. gravel road.—St. Hwy. Com.
Md., Baltimore
For constr. 1.35, 1.5, 1.0, 2.6, 2.0, 2.0, 1.0, and 2.0 mi. State Hwy.—John N. Mackall, Chm. State Roads Commission.
Mass., Boaton

Mass., Boston
For artificial stone sidewalks.—City Auditor

Auditor.

Mass., Boston
For constr. 4,280, 6,000, and 7,955 ft.

of hwy.—A. W. Dean, Chief Engr.

Mich., Cadillae
For impr. 1,659 mi. of road.—Frank
F. Rogers, St. Hwy. Comr.

Mich., Ithaea
For impr. 2,324 mi. of road.—Frank
F. Rogers, St. Hwy. Comr.

Mich., Paw Paw
For impr. 2,266 mi. of road.—Frank
F. Rogers, St. Hwy. Comr.

Mich., White Cloud
For impr. 0,547 mi. of road.—Frank
F. Rogers, St. Hwy. Comr.

Mich., White Cloud
For impr. 0,547 mi. of road.—Frank
F. Rogers, St. Hwy. Comr.

Minn., Preston

Tour Comr.

F. Rogers, St. Hwy. Comr.

Minn., Preston
For constr. 1,050 sq. yds. conc. sideWalk.—J. Dunford, Co. Aud.

Minn., St. Paul
H. 11:30 a.m., Aug. 7
For grad. and impr. sev. streets.—
H. W. Austin, Purchasing Agent.

Minn., Shakopee
10 a.m., Aug. 16
For clearing, grubbing and excavating about 7 mi. road.—Thomas H.

Walsh, Co. Aud.

Minn., Wabasha
For constr. 2.4, 1, 25 mi. State Rd.—
G. L. Ginthner, Co. Aud.

Minn., W. Minneapolis 7:30 p.m., Aug. 1
For impr. street and sewer work.—
E. A. Close, Village Recorder.

Mo., Bethany
1:30 p.m., Aug. 4
For grad. and surfacing State Rd.—
County Clerk, Harrison Co.

Mo., Buffalo
For grad., constr. culverts and bridges on 12:311 ml. State Rd.—County Clerk, Dallas Co.

Mo., Gainesville
1 p.m., Aug. 11
For grad., constr. culverts, dry rubble masonry and guard rails on State Rd.—County Clerk, Ozark County.

Mo., Hermann
1 p.m., Aug. 10
For grad. and constr. culverts and gravel pav. on 4:116 ml. State Rd.—County Clerk, Gasconade County.

Mo., Macon
10 a.m., Aug. 10
For grad. and constr. culverts on 2.803 ml. State Rd.—County Clerk, Macon County.

Mo., Paris
For grad. and constr. culverts and For grad.

2.803 mi. State Rd.—County Clerk, Macon County.

Mo., Paris

For grad. and constr. culverts and guard rail on 6.7 mi. State Rd.—County Clerk, Monroe County.

Mo., Osceola

For grad. and constr. culverts and grav. pav. on 2.104 mi. State Rd.—County Clerk, St. Clair County.

Mo., St. Louis

For pav. and curb. sev. streets.—Bd. Public Service.

Mo., Sedalia

For grad. and constr. culverts on 3.274 mi. State Rd.—County Clerk, Pettis County.

N. H., Concord

For constr. 1.9 mi. and 1.5 mi. road.

—F. E. Everett, St. Hwy. Comr.

N. J., Atlantic City

For constr. 8,123 sq. yds. road surface.—A. L. Grover, Chief Clk., St. Hwy. Dept.

N. J., Bridgrein

2 n.m., Aug. 9

face.—A. L. Grover, Chief Cik., St. Hwy. Dept.

N. J., Bridgeton

For constr. State Hwy. Route No. 15.

Howard L. Tyler, Co. Cik.

N. J., Elizabeth

2:39 p.m., Aug. 2

For constr. sheet asphalt rdway.—
Jacob L. Bauer, County Engr.

N. J., Guttenberg

S p.m., Aug. 7

For reimpr. sev. streets.—George W. Klein, Town Clerk.

N. J., Hackensack

For constr. Section 3, county road.

Jasper M. Harkness, Clerk, Board of Chosen Freeholders.

N. J., Hackensack

For constr. 17,680 sq. yds. reinf. conc. pav.—A. L. Grover, Chief Cik., St. Hwy. Dept., Court House.

N. J., Hackensack

For constr. reinf. conc. pav. on State Hwy.—A. L. Grover, Chief Cik., St. Hwy. Dept., Court House.

N. J., Hackensack

2 p.m., Aug. 9

For constr. asphalt and granite block pav.—A. L. Grover, Chief Cik., St. Hwy. Dept., Court House.

N. J., Hackensack

2 p.m., Aug. 9

For constr. asphalt and granite block pav.—A. L. Grover, Chief Cik., St. Hwy. Dept., Court House.

N. J., Hillside

S:15 p.m., Aug. 2

For constr. conc. curb and gutter.—

For constr. asphalt and granite block pav.—A. L. Grover, Chief Clk., St. Hwy. Dept., Court House.

N. J., Hillside S:15 p.m., Aug. 2
For constr. conc. curb and gutter.—
George Compton, Town Clerk.

N. J., North Bergen S p.m., Aug. 3
For impr. street intersections.—Edward A. Ryan, Town Clerk.

N. J., Rutherford S:15 p.m., Aug. 1
For grad. street.—F. A. Stedman, Borough Clerk.

N. J., Trenton 11 a.m., Aug. 10

Borough Clerk.

N. J., Trenton

For constr. bit. conc. shoulders.—A.
L. Grover, Chief Clerk, St. Hwy. Dept.,
Broad Street Bank Bldg.

N. Y., Boro. of Bronx

I a.m., Aug. 1

For constr. asphalt pav., curbs and sidewalks.—Henry Bruckner, Borough President, Municipal Bldg.

N. Y., Boro. of Brooklyn, II a.m., Aug. 2

For regulating and pav. sev. streets.—Edward Riegelmann, Boro. President,
Borough Hall.

N. Y., Boro. of Manhattan, 2 p.m., Aug. 2

For regulating and repav. sev. streets.—Julius Miller, Boro. President,
Municipal Bldg.

N. Y., Saranac Lake 7:30 p.m., Aug. 1
For impr. sev. streets.—Harry Hull,
Village Engr.
N. Y., White Plains 10 a.m., Aug. 7
For constr. of street.—F. L. Merritt,
Cik. Bd. Supervisors.

N. Y., White Plains 10 a.m., Aug. 7
For constr. of street.—F. L. Merritt,
Cik. Bd. Supervisors.
N. C., Henderson 3 p.m., Aug. 17
For impr. cer. streets.—S. B. Burwell, City Cik.
O., Akron 10 a.m., Aug. 7
For constr. guard rail.—Scott Porter, Cik. to Co. Comrs.
O., Elyria Aug. 4
For grad., drain. and constr. road.—
A. W. West, Cik. to Co. Comrs.
O., Georgetown Aug. 5
Construction of road impr.—J. P. Stephan, Co. Auditor.
O., Portsmouth Aug. 7
For changing location of road.—Roy H. Coburn, Co. Aud.
O., Toledo 12 m., Aug. 1
For grad and pav. sev. streets.—W. T. Jackson, Dir. Pub. Service.
O., Wadsworth 12 m., Aug. 15
For constr. vit. brick pav.—R. W. Simester, Village Cik.
Ore., Prinville 10 a.m., Aug. 2
For constr. 8 mi. road.—Asa W. Bartles, Co. Cik.
Pa., Vandergrift 7:30 p.m., Aug. 7
For impr. street.—W. T. Smith, Boro. Secretary.
Wash., Okanogan Aug. 8
For grad., drain. and surfacing 1 mi. hwy.—Bd. Co. Comrs.
Wash., Seattle
For grad. and graveling about 20 mi. water grade hwy., est. \$700,000.—
James Allen, Hwy. Comr.
Wash., South Bend Aug. 10
For constr. pile and timber bulkhead on road.—Co. Aud.
Wash., Tacoma Aug. 12
For grad. and pav. street.—County Engineer.
W. Va., Charleston For surfacing 2 mi. road.—R. N. Engineer

Engineer.

W. Va., Charleston
For surfacing 2

Moulton, Co. Clerk.

W. Va., Wheeling
For constr. brick surf. on road.—A.
C. Hoffman, Co. Rd. Engr.

Wiss, Madison
For grad. and surfacing sev. roads.
—State Highway Commission.

SEWERAGE

Ga., Albany

For constr. sev. sewers.—P. F. Whittier, Dir. Public Works.

In., Blairstown

For constr. san. sewers and sewage treatment plant.—C. Goss, Town Clerk.

Mass., Newton

II a.m., Aug. 9

For collection, removal and disposal of garbage and waste.—G. E. Stuart, St. Comr., City Hall.

Minn., Hopkins

For laying sewer.—Village Council, West Minneapolis.

N. J., Jersey City

3 p.m., Aug. 1

For impr. street and extension of pipe sewer.—Edward J. Holland, City Clerk.

plpe sewer.—Edward J. Holland, City Clerk.

N. J., Linden
For constr. sev. lateral sewers.—Jacob L. Bauer, Township Engr.

N. J., Newark
10 a.m., Aug. 22
For constr. city dock local sewer connection.—Passaic Valley Sewerage Comrs., 128 Market St.

N. J., Union
Portage Sewers and appurt.
—W. W. Friberger, Clerk of Comrs. of Sewerage District No. 1.

N. Y., Boro, Bronx
11 a.m., Aug. 1
For constr. sewers and appurt.—Henry Bruckner, Boro. President, Boro. Hall.

N. Y., Boro, Manhattan
Por. atteration and impr. of sewer.—Julius Miller, Boro. President, Municipal Bldg.

JULY

Ind

from St., t. Pl., e

Ind line line outer

Ind solae \$20,00 Ind nelto \$36,40 Unst Wash of \$1 Rd.

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gradin colut erty east side St., wall

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An vot ame of stru Galimi Bon for

O., Avondale
For constr. sewage disposal system for school bldg.—W. Hinz, Clerk of Avondale Village School Dist.
O., New Boston
R. Middaugh, Clk. of Village.
Okla., Oklahoma City 12 m., Aug. 2
For constr. filtration plant.—C. F. Semmelback, City Clerk.
S. D., Avon
For 11,020 ft. sewers.—Dakota Engr.
Co., Western Nat'l Bank Bldg., Mitchell.
Wis., Appleton
For constr. sewer.—E. L. Williams, Clerk to City Council.

LIGHTING AND POWER

0., Sylvania
For lighting of streets.—Park Wagonlander, Village Clerk.

WATER SUPPLY

Cal., Santa Rosa
For extension of water system, est. \$25,000.—L. L. Mills, City Engr.
N. Y., Boro. Manhattan 11 a.m., Aug. 2
For laying water mains and appurt. in Boros. of Bronx and Richmond.—Nicholas J. Hayes, Commissioner of Water Supply, Mun. Bldg.
N. Y., Boro. Manhattan
For removing old tubes, bridges and baffle walls, etc., from boiler at pumping station and installing new tubes, bridge and baffle walls, etc.—Nicholas J. Hayes, Comr. Water Supply, Mun. Bldg.

J. Hayes, Comr. Water Supply, Bidg.
N. D., Walhalla
For constr. waterworks system.—
Charles L. Pillsbury, Engr., 716 Capital Bank Bldg., St. Paul, Minn.
O., Bellefontaine
For constr. addition to water-electric plant.—Marian E. Smith, Clk. to Dir. Pub. Service.
O., Cincinnati
For pav. street and laying water Pub. Ser.

For constr. part of water supply system.—A. J. Hieber, Clerk to Co. Comrs.

omrs

Comrs. Okla., Okeene 3 p.m., Aug. 7
For constr. waterworks and electrical extensions.—W. H. Wooten, City Clerk.

Pa., Farrell Aug. 1
For constr. conc. dam on the Shenango River.—J. K. Harris, Engr.
Utah, Ogden City 10 a.m., Aug. 1
For waterworks extension, est. \$150,000.—C. O. DeWolf, City Recorder.

DRAINAGE AND IRRIGATION

Ark., Little Rock 2 p.m., Aug. 15
For constr. main and lateral ditches.
—Comrs. Cummins Drainage Dist.,
Capitol Bldg.
Cal., Merced Aug. 1
For excav. and constr. canal.—R. C.
Starr, City Engr.
Ind. Kekome 2 p.m., Aug. 12

For excav. and constr. canal.

Starr, City Engr.

Ind., Kokomo

For constr. of ditch.—Elisworth
Hunt, Commr. of Drainage.

Mo., Benton

For excav. and ditch constr.—G. W.
Spearman, Co. Cik.

N. J., Rutherford

For constr. storm water drain.—F.
A. Stedman, Borough Clerk.

Texas, Galveston

12 m., Aug. 15

For dredging Houston Ship Canal.—
U. S. Engr. Office.

BRIDGES

Cal., Stockton Aug. S For constr. 6 conc. bridges.—Board of Supervisors.

II., Chicago
For structural and cast steel repairs to bridge.—Charles R. Francis; Comr. Public Works, City Hall.

to bridge.—Charles R. Francis, Comr. Public Works, City Hall.

III., Chicago 1 p.m., Aug. 28
For constr. superstructure of hwy. bascule bridge.—Henry A. Zender, Co. Supt. of Pub. Service.

Ind., Indianapolis 10 a.m., Aug. 8
For constr. 9 bridges on St. Hwy.—
J. D. Williams, Dir. St. Hwy. Com.
Ind., Rockville 1 p.m., Aug. 8
For impr. two bridges—Balph E.

J. D. Williams, Dir. St. Hwy. Com.

Ind., Rockville
For impr. two bridges.—Ralph E.
Porter, Co. Aud.

Kan., Kingman
For constr. 266 ft. of bridge.—C. C.
Martin, City Engr.

Minn., St. Paul
For constr. 10,800 mi. culverts, etc.
—St. Hwy. Com.

Minn., Shakopee
For constr. two conc. bridges.—
Thomas H. Walsh, Co. Aud.

Miss., Canton
For creosoted pipe and timber bridge.
—Chancery Clk., St. Hwy. Com.

Miss., Gulfport
For constr. State Aid bridge.—Chancery Clk., St. Hwy. Com.
Miss., Quitman
For bridge repair.—Chancery Clk.,
St. Hwy. Com.
N. J., Elizabeth
For constr. culvert work.—Jacob L.
Bauer, County Engr.
N. J., Newark
For constr. plate girder bridge.—
George C. Bergen, Purchasing Agent.
N. Mex., Santa Fe
9 a.m., Aug. 16
For constr. 2 bridges.—L. A. Gillett,
St. Hwy. Engr., Capt. Bldg.
N. Mex., Santa Fe
10:30 a.m., Aug. 16
For constr. bridge.—L. A. Gillett, St.
Hwy. Engr., Capttol Bldg.
O., Clacinnati
12 m., Aug. 4
For constr. abutment and raised slab
on bridge.—Jacob Krollman, President,
Bd. Co. Comrs.
O., Columbus
10 a.m., Aug. 10
For bridge repair and culvert work.
—R. W. Smith, Clk., Co. Comrs.
O., Sidney
For constr. road bridge.—W. A. Harmon, Co. Aud.
O., Wooster
For constr. bridge.—F. C. Redick,
Clk. to Co. Comrs.

MISCELLANEOUS

Cal., Reedley
Aug. 1
For 60,000 gal. steel water tank and tower.—H. Trebley, City Clk.
III., Chicago
11 a.m., Aug. 3
For furn. 160 tons granite pav. blocks.—Charles R. Francis, Comr. Public Works, City Hall.
Ind., Indianapolis
10 a.m., Aug. 8
For one gasoline hoist, two Dram. dragline, gravel excavating outfit.—L. K. Fesler, Co. Aud., Marion County.
La., New Orleans
3 p.m., Aug. 10
For boring 3 test wells.—J. H. Walsh, General Manager, Bd. Comrs.
Minn., St. Paul
11:30 a.m., Aug. 7
For 15-ton, hand operated, traveling type bridge crane.—H. W. Austin, Purchasing Agent.

type bridge crane.—H. w. chasing Agent.

N. J., Longport
For constr. of extension of stone jetties or sea walls.—William S. Gilmore, Boro. Cik.

N. Y., Boro. Manhattan
10:30 a.m., Aug. 1

For furn. hose couplings, hose noz-zles and motor trucks to Dept. of Street Cleaning.—Board of Purchase, Munici-pal Bldg.

Work Contemplated

STREETS AND ROADS

Ala., Russell Co.—To construct a link in the Dixie Overland highway, connecting Girard and Crawford, in Russell county, Alabama.

Fla., Tampa—Res. three million dollars for hard-surfaced highways.

Fla., Pinellas—On August 15 Pinellas will vote on an issue of \$2,695,000 of bonds for construction of highways. Hillsborough plans to build 160 miles of roadways, the greater part new, with some replacements and adding to width of present built roads. Pinellas plans to contract some 101 miles, including a considerable replacement of wornout roads and bringing others up from nine-foot width to sixteen feet.

Fla., Dade Co.—The expenditure of \$200,000 of federal aid funds on state road No. 4, from the Broward county line southward in Dade county, this amount to be matched with county funds.

Fla., Polk Co.—To make survey of

finds.

Fla., Polk Co.—To make survey of road No. 8 from Frostproof south nine miles and to advertise for bids for surfacing same. The same action was taken with respect to six miles of state aid road No. 134 from Lakeland northeast to connect with state aid road No. 123.

Fla., Leon and Wakulia Counties—County commissioners requested aid on three mi. of rock road in these counties. Department announced inability to comply with request, assured that out of next year's budget he would recommend \$50,000 to meet Wakulia county's bonds.

Fla., Taylor Co.—Senator Weaver, Messrs. Scales, Puckett and Lough-ridge asked for \$6,000 aid per mile on ten miles of state aid road No. 108 in Taylor county.

Fla., Pensacola — Plans prepared grading, curbing and paving with vitr. brick, asphalt, concrete or asphaltic concrete on concrete base, 14th Ave., Independence, La Rua, Barcelona, Strong and Gonzalez Sts., \$50,000.

Strong and Gonzalez Sts., \$50,000.

Florida—The report of reviewers on three proposed county highways submitted to the board, the projects were ordered posted and work on them will begin as soon as practicable. Myrtle Ave., 740 feet of road, fifty foot right of way; O'Connor road, 7,496.7 feet of road, 66 foot right of way; and the Thomas road, 17,239 feet of road, 66 foot right of way.

Ida., Caldwell—State and county will construct a highway west from this city to the Golden Gate highway district.

Ida., Nez Perce Co., Kamiah High-

city to the Golden Gate nighway district.

Ida., Nes Perce Co., Kamiah Highway Dist. (P. O. Lewiston)—Election results to issue Highway bonds to the amount of \$50,000.

III., Chicago—Warwich Ave., Grace St., N. Linden Ave. to Waveland, to be improved by const. sewers of tile pipe, curbing, guttering, filling in and paving with standard asphalt.

III., Chicago—Improve S. California Ave. S. Fairfield, between W. 55th and W. 57th Sts.

III., Chicago—Ingleside Ave. to be improved by cement sidewalks.

III., Chicago—To improve Devon Ave. with 6 ft. cement sidewalks.

Ill., Chicago—N. Harding Ave., W. 55th St., N. Lavergne Ave., N. Maruva Ave. and other streets to be repaved; new water pipe laid with cast iron hydrants and valves.

Ill., Chicago—Public improvement to sts. planned: Spalding Ave. to be repaved, curbed and sewer built; Wright Ave., resurf.; Dover St. and N. Sawyer Ave., Merwood Park Ave. to Nettleton, W. Monroe St. to E. line Central Park Blvd.

Ill., Champaign Co. (P. O. Urbana)—An issue of Road bonds proposed.

Ind., Shelbyville — Representatives from Windsor and Strasburg met with the Chamber of Commerce, of Shelbyville, on Friday morning for the purpose of discussing the location of the state aid road from Shelbyville to Windsor.

Ind., Indianapolis—Linwood Ave., from south property line of first alley

state aid road from Shelbyville to Windsor.

Ind., Indianapolis — Linwood Ave., from south property line of first alley south of St. Clair St., west side; to south curb line of Tenth St., by grading the roadway from curb line.

Ind., Indianapolis — Improvement resolution, Bernard Ave., from west property line of Cornelius Ave., to east property line of Conser Ave.

Ind., Vigo Co.—Will offer at Terre Haute on August 2 a bond issue of \$16,500 on the U. C. Cox Rd.

Ind., Boonville—To build three and one-quarter mi. of road north of Lynnville on the Boonville and Petersburg Rd. This will complete the unimproved part of the road leading from Evansville to Washington, Ind., by way of Boonville and Petersburg, and will shorten the route to Indianapolis from Evansville by several miles.

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Ind., Indianapolis—Thirty-second St., from west property line of Illinois St., to east property line of Boulevard Pl., except at intersections of Kenwood

Ind., Indianapolis—Improvement resolution, Villa Ave., from south curbline of Orange St., to north property line of Minnesota St., by curbing the outer edges of the roadway.

Ind., Jasper Co.—Will offer at Renssolaer on August 9 a bond issue of \$20,000, on the C. M. Dewey Rd.

Ind., Perry Co.—Will offer at Cannelton on August 14 a bond issue of \$36,400, on the Dan Gayer Rd.

Ind., Daviess Co.—Will offer at Washington on July 15 a bond issue of \$15,600 on the Francis M. Hunter Rd.

Ind., Floyd Co.—Will offer two road bond issues at New Albany. One to be sold on July 15 is for \$4,000, bearing 4% per cent, on the Scott Rd., and the other is to be offered on July 29. It for \$35,040, on the Bolden and Greenville Rd.

ville Rd.

Ind., Miami Co.—Will open bids at Peru on August 8 on the Charles E. Hann gravel road, with culverts, bridges and arches.

Ind., Vigo Co.—Will offer two road bond issues at Terre Haute on July 8, the amounts being \$10,000 and \$5,500.

Ind., Bear Lake Co. (P. O. Paris).—The election resulted in favor of issuing Road Improvement bonds to the amount of \$55,000.

Ind., Indianapolis—In the street bonds in Indianapolis—In the street commissioner's preliminary budget draft are items of \$75,000 for unimproved streets; \$39,500 for the sewer department.

epartment.

Ind., Indianapolis—Impv. res. to rade and pave roadway, Ruckle St.,

Indianapolis-Improvement res-Ind., Indianapolis—Improvement resolution, Cottage Ave., from east property line of State Ave. (north side), east curb line of Asbury St. (south ide), to west curb line of Randolph St., by grading and paving the side-

side). To wear
St., by grading and paving the
walks.
Ind., Indianapolis — McCarty St.,
south side, from east property line of
Illinois St., to west property line of
Meridian St., by grading and paving
the sidewalks with cement to a uniform width of five ft., placed next to
the property line.
Ind., Floyd Co., Edwardsville, Galena
Rd. Dist. (P. O., New Albany)—Issue
of Road Improvement bonds to the
amount of \$74,000.
Ia., Ames—State highway commissioner, Ames., paving in various

counties.

Ames—state highway commissioner, Ames, paving in various counties.

Ky., Bath Co. (P. O. Owingsville)—An election will be held on Sept. 16 to vote an issue of road bonds to the amount of \$250,000.

Ky., Louisville—On July 25, \$74,000 of road bonds will be sold for the construction of the Edwardsville and Galena Rd.; on July 29, \$35,040, for the improvement of the Greenville and Bordon Rd., and on August 5, \$42,000 for the construction of the Old Vincennes Rd., and at the same time, \$24,000 for the improvement of the St. Mary's Rd.

Las., N. Orleans—Plans bond paving issue of \$1,400,000.

Mich., Lansing—It is determined to grade and gravel Howard St. from Turner St. to Capitol Ave.

Mich., Lansing—Res. adopted for grading and gravelling Prospect St. from Clemens Ave. to Fairview Ave.

Mich., Lansing—Res. to grade and gravel Magnolia Ave. from Kalamazoo St. to P. M. R. R., curb and gutter on Cleveland St., from Sheridan St. to Crapitol Ave.

Mich., Grand Rapids—Program to

Ave.
Mich., Grand Rapids—Program to
pave various streets, grade-pave with
reinforced concrete, sheet asphalt on
grade base, brick on concrete to lowest
curbs, manholes, etc., storm sewers and
water service.
Mich., Sunfield—Sunfield, Sebewa and
Orange township people netitioned for

Mich., Sunfield—Sunfield, Sebewa and Orange township people petitioned for a 16-ft. highway to be built from the Sunfield village line north seven and a half miles to Carbaugh's corners to connect with state trunk line road.

Mich., Detroit—An ordinance, changing and establishing the grade of Ashland Ave., roadway, curbs and sidewalks from a point 1,858.20 feet south of the south line of Kercheval Ave., northerly to a point 456 feet north of the north line of Kercheval Ave., and of Kercheval Ave., are supplied to the most of the north line of Manistique Ave., easterly to the west line of Alter Rd.

Mich., Detroit—Vacating and open-g of Evelyn Ave. Edgewood sub-

Mich., Detroit—Vacating and opening of Evelyn Ave. Edgewood subdivision.

Mich., Detroit—Extensive program to improve various streets and alleys, grading, paving and curbing.

Mich., Grand Rapids—City to furnish approximate estimates of cost for the following improvements: Grading and paving with sheet asphalt on a concrete base, Eastern Ave. from Michigan St. to Fountain St., including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with sheet asphalt on a concrete base. Horton Ave. from Burton St. to Withey St., including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with sheet asphalt on a concrete base, Darwin Ave. from Burton St. to south end, including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with sheet asphalt on the present base, Alexander St. from Eastern Ave. to Giddings Ave., including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with sheet asphalt on the present base, Alexander St. from Eastern Ave. to Giddings Ave., including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with reinforced concrete, Brainard Ave. from Michigan St. to the north end, including the construction of the necessary curbs, gutters, manholes, catch basins, storm water sewers, sewer laterals, water services, concrete sidewalks and approaches; grading and paving with concrete, Sheldon Ave. Alley from Wealthy St. to Logan St., including the construction of the necessar

width of 85 feet from the intersection of Greenbrier Ave. and Ivy St. to the intersection of Arcade St. and Lake Como and Phalen Ave., diagonally across the N.E. 4 of the S.E. 4 and the East 165 ft. of the N.W. 4 of the

East 185 ft. of the N.W.4 of the S.E.4. Minn., St. Paul—Res. of impyt., Lincoln Ave. from Oakland Ave. to Milton St., Goodrich Ave. from the easterly line of the alley running north and south in Block 6, Terrace Park Addition to Milton St., Fairmount Ave. from Dale St. to Milton St., Dale St. from Grand Ave. to Fairmount Ave., St. Albans St. from Summit Ave. to Fairmount Ave., St. Albans St. from Summit Ave. to Fairmount Ave., Victoria St. Albans St. from the southerly line of Fairmount Ave. to the easterly line of Kenwood Parkway, including sewer, water and gas connections from street mains to property lines complete, where not already made, also including curbing and paving alley and driveway approaches.

Mo. Kansas City—Res. to improve

Mo., Kansas City—Res. to improve Montgale Ave. from Peevy to 12th, widen and pave.

Mo., Kansas City—City to improve 16th St. from Hardesty Ave. to Topping with rock, asphalt, 2 in. thick on concrete.

Mo., Kansas City—Res. construct ncrete curbing, both sides Bessing-

concrete curbing, both sides Bessington Ave.

Mo., Kansas City—To pave 29th St.
with plain Portland cement 8 in. thick, grade Indiana Ave., pave 11th St., curb Norton Ave.

Mo., Kansas City—Res. to re-sur.
with brick Woodland Ave., south line to north line 12th, full width.

Mo., Kansas City—Pav. res. for 11th St., Tracey Ave. to the Pasco, full width, sheet asphalt 1½ in. thick on conc., bit. conc. in Portland cement, const. 8 in. thick.

Mont. Livingston—A new highway in Park county may be constructed this fall or next spring. A survey for a road between this city west to the Gallatin county line now being made. The new road will be a state highway project.

Mo., Kansas City—Res. to construct nc. gutters both sides 69th St. Ter-

Mo., Kansas City—To repave asphalt pavement on Pendleton Ave. from Brooklyn to Ohio St.

Mo., Kansas City—Res. to grade 72nd St. to Oak, Lochridge Ave. from Oakley to Topping, Chestnut Ave. to north line 62nd St. and various others in city.

ley to Topping, Chestnut Ave. to north line 62nd St. and various others in city.

Nev., Carson City—Plans completed on following projects: No. 15, West Co. line to Vivian, Elko Co., 8.34 mi. grading; 22, West Co. line to White House, Eureka Co., 6 mi., grading and graves surf.; 31, Eureka to Hayranch, Eureka Co., 12.2 mi. grading and gravel surf.; 4, 3 mi. no. of Carters to Holbrook, Douglas Co., 4 mi. grading and 25 per cent surfacing; 46, 6.9 mi. S. E. of Canyon to 3.6 mi. S. E. of Rose Well, Nye Co. 18.85 mi. grading; 26, Reno to Lawtons, Washoe Co. 4 mi. grading and gravel surf.; 16, West Co. line to Battle Mountain, Lander Co., 8.5 mi. widening grade and gravel surf.; 46, through city of Yerington, Lyon Co., 1.5 mi. 18 ft. conc. surf. Projects for which plans are being prepared are as follows: Portions through City of Elko, Elko Co., 18 ft. grav. 30 ft. rdway; Fallon to Grimes Ranch, Churchill Co., 10 mi. 15 ft. grav. surf.: through city of Fallon, 1.24 mi., 18 ft. conc. surf.; Hazen to Wadsworth, Lyon, Churchill and Washoe Cos., 15.65 mi. grad. and grav. surf.; Grimes to Salt Wells, Churchill Co., 5.40 mi. 15 ft. gravel surf.

N. J., Jersey City—An ordinance to establish a legal grade for Linden Ave. in Jersey City, for State St. between Cornelison Ave. and Grand St.

N. J., Paterson—To survey for a new road on west shore of Greenwood Lake. State aid will be \$16,500.

N. J., Jersey City—Temporary Impvt. bonds of \$2,700 for repaving South St. from Orden to Palisade Ave.

N. J., Jersey City—Temporary Impvt. bonds of \$2,700 for repaving South St. from Ogden to Palisade Ave.

N. J., Jersey City—Temporary Impvt. bonds of \$2,700 for repaving South St. from Ogden to Palisade Ave.

N. J., Jersey City—\$1,500 approp. for impv. Virginia Ave.

N. J., Newark—An ordinance to provide for the opening of Hobson St., 50 feet wide, from Shaw Ave., about 100.43 feet southwesterly to a property line, adopted September 20, 1921; the paving and repaving of Abington Ave., from Mt. Prospect Ave. to Lake St., according to the provisions of an ordinance of the city of Newark entitled, "An ordinance to provide for the paving and repaving of Abington Ave., from Mt. Prospect Ave. to Lake St., with either asphalt pavement (½-inch top surface, 1½-inch binder) on a six (6) inch concrete foundation, or with bituithic pavement (2-inch top surface on a six (6) inch concrete foundation, passed August 2, 1921; the repaving of Springfield Ave. from Morris Ave. to the Irvington line.

N. J. Jersey City—The improvement

Springfield Ave. from Morris Ave. to the Irvington line.

N. J., Jersey City—The improvement of all that part of Oxford Ave., between Bergen Ave. and Sackett St., in the city of Jersey City, by improving same with asphalt pavement on a concrete base.

N. J. J.

the city of Jersey City, by improving same with asphalt pavement on a concrete base.

N. J., Jersey City—The improvement of part of Oxford Ave., between Bergen Ave. and Sackett St., in the City of Jersey City, by improving same with asphalt pavement on a concrete base.

N. J., Weehawken—An ordinance, \$29,000.00, for the improvement of Highwood Ave., Weehawken, County Hudson, and the southerly line of Liberty Place to the southerly line of Highwood Ave.

N. J., Weehawken—Ordinance, \$27,-000.00, for the improvement of King Ave., from the southerly line of the Hudson Blvd. east to the southerly terminus of King Ave., which is the northerly line of Bellevue street, Weehawken.

N. J., Weehawken—Ordinance, \$24,-000.00, for the improvement of West Nineteenth St., from the westerly line of the Bergen Turnpike (Hackensack Plankroad), to a point about 737 feet westerly from the westerly line of said Hackensack Plankroad.

N. J., N. Bergen—An ordinance improving of Tonnelle Ave. in the Twp. of North Bergen in the County of Hudson, N. J., from the east side of Bergen Turnpike to the south side of Church Lane, by grading, curbing, flagging, paving, sewering and draining said street.

N. J., N. Bergen—An ordinance for the improvement of Church Lane, in the Twp. of North Bergen, the east side of Bergen Turnpike to the west side of Hudson Blvd., by grading, curbing, flagging, paving, sewering and draining said street.

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N. M., Albuquerque—To issue \$115.000 Sewage Disposal Plant bonds, \$50,000 Storm Sewer bonds, \$50,000 Reservoir 5000 Storm Sewer bonds, \$50,000 Reservoir bonds, \$25,000 Water Main bonds.

N. Y., Syraeuse—Bids for the biggest block of paving contracts offered by the city administration this for the city administration this for the city administration this contract and Supply on July 31, it was decided. There are 12 jobs in the lot and it is estimated the cost will be in the neighborhood of \$350,000.

N. Y., Burilington—To issue \$250,000 of bonds to impv. Road No. 21, known as Mount Holly to Burilington, distance 7 mil. City. Road No. 22, Section 4, distance fity—one hundredths of a mile: Road No. 22, Section 5, Edgewater Park Station to State Highway Route No. 2, distance of one and one-half miles. Said roads to be reconstructed with sheet asphalt upon concrete and macadam foundation and concrete.

N. C. Greensboro—Bids will be asked in about 30 days for 23 new streets, voted in favor of improvements.

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N. C. Henderson—A bond lessant Garden via Vandalla, \$215,000.

N. C. Lumberton—Bd. Aldermen authorized sale of additional \$200,000 bonds for street improvements.

G. Honderson—Abond benemen authorized sale of additional \$200,000 bonds for street improvements.

G. Henderson—Abond benemen authorized by the city council.

O. Ironton—Issue of \$63,000 street improvement bonds.

O. Honderson—Abond benemen authorized by the limited by the city council. on the part of the paving of the

O., Pertsmouth—Gallia pike, bonds sold \$117,000.

sold \$117,000.

O., Defiance—Several streets, bonds to be sold, \$24,748.

O., Orrville—Paradise St. bond sale, \$15,600, July 26, N. Walnut St., bond sale same day, \$15,400.

O., Marysville—Union and Logan counties jointly grant construction of Denny and East Liberty roads.

O., Cleveland—Clague Rd., N. Olm sted village, hearing by commissioners Aug. 2.

sted village, hearing by commissioners Aug. 2.

O., Greenville—West St., bond sale Aug. 4, \$4,500.

O., Wooster—Ella St., bond sale, \$9,000, July 26.

59,000, July 26.

O., East Youngstown — Sidewalks, council approves \$6,000 bond issue.

O., Jackson—Chillicothe St., \$23,000, of which county will contribute \$6,000.

O., Cincinnati—City to change and improve Owasca St., Iris Ave., Paul St. and various others, to lay sewers, drains and inlets and pave with reinf.

concrete.

O., Kenmore—Kenmore Blyd., new estimate made for resurfacing south side of same.

Ont., Ingersoll—Having plans prepared and takes bids about July 24, concrete pavement on Charles and Bell Sts., \$92,000. Prices wanted on materials. R. B. Hutt, town engr.

Ont., Ottawa—Had plans prepared resurfacing with asphalt, 7,500 sq. yd. Carter St. from Lisgar to Argyle Sts., \$15,500; 2,000 sq. yd. Somerset St. from Metcalfe to O'Connor Sts., \$4,400; 2,400 sq. yd. Lyon St. from Gladstone to Catharine Sts., \$4,400; Lyon St. from Chamberlain to Pawell Sts., \$5,000. A. F. Macallum, city engineer.

O., Cuyahoga Falls—Sackett St.,

Chamberlain to Pawell Sts., \$5,000. A. F. Macallum, city engineer.

O., Cuyshoga Falls—Sackett St., Third St. and Tallmadge Ave., paving, water line and grading, Maplewood, Merline, Albemarle and Grant Aves., sidewalks, legislation enacted; Front St., sidewalks, both sides of street, legislation pending.

O., East Liverpool—Lincoln highway between Greens Hill and Gilmore stop to be resurfaced this year by state.

O., Newark—Roads from Luray and from Hebron to Buckeye Lake in Licking county, state funds promised if county commissioners will co-operate, relocation and improvement.

O., Lexington—Steam Corners Rd. to be paved for 1,300 feet inside the city limits by county.

O., Toledo—Washington Twp.—Stone road improvement, also known as Upton Ave., bond sale July 26, \$120,517; also Sylvania and Springfield Twps. stone road, also known as McCord Rd., bonds same day, \$87,866; also Washington Twp. stone road, so known as McCord Rd., bonds same day, \$87,866; also Washington Twp. stone road improvement, known as Freeman St., bonds same date, \$23,793.

O., Wooster—Lincoln highway in this bonds same day, \$87,866; also washing ton Twp. stone road improvement, known as Freeman St., bonds same date, \$23,793.

O. Wooster—Lincoln highway in this county, brick.
O., Conneaut—Monroe St. paving, est. asphalt, \$18,145; concrete, \$16,408; brick, \$19,940.
O., Wooster—E. Church St., bond sale Aug. 1, \$7,000.
O., Findlay—Main st., council considering replacing wood block by sheet asphalt.

O., Findiny—Main St., council considering replacing wood block by sheet asphalt.
O., Teledo—Eight streets, Service Director Jackson will award contracts for paving and repair, July 25.
O., Steubenville—Lincoln from Railroad to Tweed Aves., resurfacing or repairing, ordinance introduced.
O., Dayton—Wayne Ave., bonds approved by state attorney-general. Ordinance to be passed.
O., Steubenville—Third St., service director will advertise for bids for repaving on two stretches.
O., Hamilton—Lincoln Ave. will probably be cut down and graded.
O., Port Clinton—Portage Twp. Rd. to be surfaced with concrete.
O., New Boston—Four streets and several alleys, engineers making estimates.

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O., Youngstown-

several alleys, engineers making estimates.

O., Youngstown—Albert and Olson Sts., Belmont, several streets, bond issue of \$50,000 defeated.

O., Cleveland—Brookport Rd. No. 4. Parma Twp. and Brooklyn Heights village, hearing by commissioners.

O., East Liverpool—Lincoln Way, 2 mi. between Greens Hill and Gilmore stop on Y. & O. to be brick surfaced.

O., Lisbon—Road from Duquesne St., Columbiana to a point near Quigley farm, commissioners will invite bids for resurfacing half mile, est. \$5.680. Ravenna: Parts of Clinton and Meridian Sts., declaratory resolutions adopted by council.

O., Carrol Co.—Bond issue \$30,700 for improving roads.

O., Medina—Herman's Corners, Bennett's Corners roads bonds sold, \$78,-200.

O., Toledo—To construct an improvement known as Jerusalem Twp. Stone Road Improvement No. 200; also known as Corduroy Road Extension.
O., Canton—Serpentine Rd. bond issues for construction to probably be submitted to voters in November, about \$180.000.

sues for construction to probably or submitted to voters in November, about \$180,000.

O., Toledo—To construct an improve-ment known as Adams and Springfield Twp. Stone Road Improvement No. 131; also known as Angola Road and Clark St

Twp. Stone Road Improvement No. 181; also known as Angola Road and Clark St.

O., Toledo—A reinforced concrete viaduct, to cost \$371,900, is to be built on the Cleveland-Buffalo highway in Ashtabula county. Among the jobs to be let, so that work can be completed before winter, are; Allen county, Lima-Delphos road, four miles, estimated cost \$131,730; Jefferson county, four miles, Mingo-Smithfield road, \$128,000; Fulton county, one mile, Archbold-Fayette road, \$21,541; one mile, Wauseon-Napoleon road, \$23,868; Harrison county, five miles, Bridgeport-Cadiz road, \$157,633; Putnam county, three miles, Ottawa-Defiance road, \$13,300; Seneca county, stretch of Columbus-Sandusky road, \$30,350; Shelby county, one mile, Sidney-Wapakoneta road, \$34,000; Tuscarawas county, one and one-third miles, Newcomerstown-Urichsville road, \$53,858; Wayne county, three miles, Wooster-Mansfield road, \$140,097; Wood county, two miles, Perrysburg-Fostoria road, \$33,600; Wyandot county, one mile, Bucyrus-Upper Sandusky road, \$40,431.

O. Columbus—Plans grading, curbing and paving 5th Ave, from Sunbury Ave, to point 490 ft. east of Nelson Rd, North St. from High St. to Nelo Rd, North St. from

bound macadam. C. C. Lattimer, Court House, Engr.

-, Akron—M. P. Tucker, dir. Pub. Serv., takes bids in August grading and paving 2,600 ft. North Main St., 56 ft., brick or asphalt. \$60,000. \$90,000. E. A. Kemmler, Delaware Bldg., Engr.

0., Curin—City to impv. Stettinus Ave., N. Line, Salem to Handyside Ct., pav., etc.

brick or asphalt. \$60,000-\$90,000. E. A. Kemmler, Delaware Bldg., Engr.

O., Curin—City to impv. Stettinus Ave., N. Line, Salem to Handyside Ct., pav., etc.

Pa., Germantown—Bill proposed to city council that about \$600,000 would be available this year for street improvements in the councilmanic district, comprising three other wards besides the Twenty-second. The most urgent need in the district was the repaving of Ridge Ave., through Wissahilckon and Roxborough. Next the repaving of Chelton Ave., from Morton St. to Wister St., formerly Stenton Ave. The cost was estimated at \$106.000. Germantown Ave., from Walnut lane to Gowen Ave.

Pa., Pittsburgh—Dept. Pub. Wks. has submitted measure to council which would authorize city asphalt division to prepare roadways on the two viaducts of the Boulevard of the Allies, at cost of \$15.120. Council passed ordinance for impvt. of Pioneer Ave. at cost of \$15.000.

Pa., Catasauqua—Voters here approved bond issue of \$120,000 for perm. street impvts.

Pa., Phila.—Bill for improving Delaware Ave. at cost of \$750,000 is in City Council and will be acted on in a few days. Chief Dunlap of Hwy. Bureau stated that plans are ready and work will be pushed. Work will include grading and paving, constructing sewers and other underground impvts.

Pa., Phila.—Woodlynne Council considering bond issue in sum of \$44,000 to carry on extensive street impvt. Campaign. Voters have approved the issuance of the bonds.

Pa., Harrisburg — Ordinance for a water line in Ash St., from Forster to Boas St.; for the plotting of Lerew St., to provide two six-foot sidewalks and an eight-foot cartway; for a ten-inch sewer in Primrose St., from Forster to Boas St.; for the plotting of Lerew St., to provide two six-foot sidewalks and an eight-foot cartway; for a ten-inch sewer in Primrose St., from Forster to Boas St.; for the plotting of Lerew St., to provide two six-foot sidewalks and an eight-foot cartway; for a ten-inch sewer in Primrose St., from Forster to Twentieth St., and for two light standards in B

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Pa., Pittsburg—Proposed relocation of North Canal St. is contemplated by the Pennsylvania Railroad in connection with the elimination of three grade crossings in that district.

grade crossings in that district.

Pa., Pittsburgh—Ordinance for grading, paving and curbing of Webster Ave. and Blessing St., estimated cost \$60,000; construction of relief sewers on Howe St., Canopolis St., Parody way and Beechview, College, Morewood and Ellsworth Aves., total estimated cost \$38,700.

Pa., Oil City—To issue \$200,000 St. Impvt. bonds July, 1922.
Pa., Allentown—An ordinance authorizing an issue of Street Impvt. bonds to the amount of \$60,000.

Pa., Allentown—An ordinance authorizing an issue of Street Impyt. bonds to the amount of \$60,000.

Que., Montreal—Plans paving 2,250 feet St. Catherine St. from Harbor to Marlborough Sts., 65 ft., \$45,640; 1,687 ft. Marlowe Sts., 60 ft., \$35,023; 2,062 ft. Monk Blvd., from Jolicoeur to Allard Sts., 50 ft., \$62,743; 1,125 ft. De Chacaubriand Ave. from Roy to Duluth Sts., 60 ft., \$11,823, all asphalt. E. Blanchard, Rd. Dept. engr.

S. C.—A proposal to spend \$24,000,000 within six years and to complete within that time 4,000 miles of the State highway system, more than 600 miles of which would be hardsurfaced and the remainder surfaced with sand-clay, top soil, or gravel, is to be urged before the present session of the legislature of South Carolina.

S. D., Sioux Falls—Constructive plans for immediate steps to pave East Sixth Ave., and West Havens St., and to put in large extensions to the city watermain system, were outlined at a regular meeting of the city council.

Tenn.—Tennessee has inaugurated a new federal aid road-building program involving the expenditure of \$8,000,000 for 281 ml. of roads in 20 counties.

Tenn., Nashville—State inaugurated new federal aid road building program involving expenditure of \$8,000,000 for 281 ml. of roads in 20 counties.

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Assn.

Tex., Lavaca Co.—Two issues of road bonds, for \$140,000 and \$56,000, proposed to build 26 mi. of highway in Lavaca county.

Tex., Clarksville—Bonds approved for twenty blocks more paving in Clarksville. The present paving project of forty-five blocks will be completed next week. Work is expected to begin on the new project before winter.

Tex., Happing, March 1981.

pleted next week. Work is expected to begin on the new project before winter.

Tex., Houston—Harris Co. making plans grading, surfacing with crushed rock, etc.. 3.33 mi. State Highway 2, incl. 8,885 cu. yd. excav., 18,284 gal. 4,861 cu. yd. crushed rock, 2,187 cu. yd. shell, 344.705. Howe & Wise, 211 First Natl. Bank Bldg., engrs.

Tex., Paris—Lamar Co. making plans gravel surfacing 9.89 mi. State Highway 19 from county line south, incl. 10,000 cu. yd. borrow, 15,218 cu. yd. gravel surfacing, \$63,505. W. M. Fooshee, co. engr.

Tex., Waco—Road: \$188,090. No. 6 and Highway: \$34,000. Engr., Manton Hannah. Owner, McLennan county, J. P. Lester. Gravel bit. Plans approved and drawing plans for highway.

Tex., Brownsville—Highway: \$406,866. No. 12. Engr., W. O. Washington. Owner, Cameron county, O. C. Darcey. Drawing plans.

Tex., San Antonio—Road: \$145,000.

Tex., Paris—Highways: \$74,122, \$76,-300, \$63,500, \$41,500. Engr., W. M. Forshee. Owner, Lamar county, W. L. Hutchinson. Drawing plans.

Tex., Austin—Highway: \$36,685. Engr., O. Leonard. Owner, Travis county, Geo. S. Matthews. Started.

Tex., Brenham—Highway: \$372,800.

Engr., county, started.

county, Geo. S. Matthews. Plans started.

Tex., Brenham—Highway: \$372,800.

No. 36. Engr., Gus A. Bracher. Owner. Washington county, J. H. Chappell. Gravel surf. and conc. and steel. Engr. drawing plans.

Tex., Houston—Road: \$44,705. Engr., Howe & Wise, 1st Natl. Bank Bldg. Owner, Harris county, Chester H. Bryan. Gravel bit. constr. Approved. Tex., Center.—Road: \$84,123. No. 35. Center. Engr., Ira R. Titus, Timpson, Tex. Owner, Shelby county, J. B. Burns, Center. Gravel surf. and conc. Statement approved.

Tex., Shelby Co., Joaquim Dist. (P. Ocenter).—An issue of Road bonds of \$75,000 voted.

Tex., Brownsville—Highway: \$406,-234. No. 12. Engr., W. O. Washington. Owner, Cameron county, Oscar C. Drawing plans. Darcey.

Darcey. Drawing plans.

Tex., Marlin — Highway: \$200,000.

No. 44. Engr., G. W. Courter. Owner.
Falls county, E. M. Dodson. Gravel surf. and conc. Drawing plans.

Tex., Segium—Highway: \$125,000.

No. 3. Engr., S. C. McCarty. Owner, Guadalupe county, J. B. Williams. Bit. tipping. Drawing plans.

Guadalupe county, J. B. Williams. Bit. tipping. Drawing plans.

Tex., Palo Pinto—Road: \$602,000. Engr., G. W. Courter. Owner, Palo Pinto county, E. L. Pitts. Asphaltic macadam. Project approved.

Tex., Lufkin—Roads: \$45,000 and \$133,500. Engr., G. R. Abney. Owner, Angelina county, John F. Robinson. Gravel surf. and conc. Plans approved.

Tex., Karnes Oity—Highway: \$343,000. No. 9. Karnes City. Engr., O. N. Powell, Kenedy Tex. Owner, Karnes county, D. O. Klingeman, Karnes. Gravel and bit. topping. Plans approved.

Tex., Marlin—Road: \$200,050. No. 44.

Tex., Marlin—Road: \$200,050. No. 44. Engr., G. W. Courter. Owner, Falls county, T. M. Dodson. Gravel surf. and conc. Drawing plans.

Tex., Center—Road: \$75,000. Engr.,
T. H. Dillon. Owner, Shelby county,
J. B. Burns. Gravel surf. and conc.
Bond issue voted.
Tex., Austin—Highway: \$50,000.
Engr., O. Leonard. Owner, Travis
county, Geo. S. Matthews. Bids to
July 28.

July 28.

Tex., Tyler—Smith Co. making plans grading, surfacing, etc., 14.73 ml. State Highway 37, Federal Aid Project 284, incl., 691.9 cu. yd. concrete, 58,149 sq. yd. bituminous macadam, 37,121 sq. yd. concrete pavement, 52,152 lb. reinforcing, 10,296 cu. yd. imported gravel, 11,949 cu. yd. local gravel, 5,148 cu. yd. clay binder, to be furnished by county, \$252,000. D. K. Caldwell, co. engr.

Tex., Coleman—Highway: \$220,000.
No. 7. Engr., W. E. Dickerson. Owner, Coleman county, L. G. Matthews. Gravel surf. and conc. Will be let in near future.

No. 7. Engr., W. E. Dickerson. Owner, Coleman county, L. G. Matthews. Gravel surf. and conc. Will be let in near future.

Va., Norfolk—City passed ordinance by which it agrees to pay interest on loan which business men of Norfolk will make to State for completion of certain highway work in vicinity of Norfolk, loan amounts to \$460,000 and provides for construction of following highways: Ridge Route, completion of link in Norfolk-Petersburg-Richmond line to North Carolina line, \$250,000; Route 27 (State project) from South Norfolk to connect with Elizabeth City, N. C., highway, \$100,000; Peninsula Route, section of road from Old Point to Richmond, near Lee Hall, \$100,000, Va., Harton Helghis (P. O. Richmond).—City has tentative plans for impvt. of streets, bridges, sewers, bldgs., etc., \$1,500,000 available. Stewart White, councilman; improve Steuart Rd. from North Ave. to Chamberlayne and Bartin from Poe St. to Boulevard. Wash., Sentile—Ordinance to improve East 53d St., from Latona Ave. to 1st Ave. Northeast; all in the City of Seattle. First Ave. West, from West Mercer St. to West Roy St.; all in the City of Seattle. First Ave. West, from West Mercer St. to West Roy St.; all in the City of Seattle. St. Ave. Northeast; and the construction or reconstruction of all sewers, side sewers and watermains with such appurtenances as may be necessary for the proper sewerage, drainage, water service and fire protection; the construction or reconstruction of concrete sidewalks where necessary; grading and regrading and other work necessary.

Wash., Seattle—Ordinance to establish a public street in Tract 1, Conover Court. City council to order the improvement of 20th Ave. northeast to 21st Ave. northeast to 21st Ave. northeast to 20th Ave. northeast to 21st Ave. northeast to 20th Ave. northeast to 21st Ave. northeast to 20th Ave. northeast to 20th Ave. northeast to 20th Ave. northeast to Ravenna Boulevard.

Wash., Seattle—Improve Florentia St. from West Lake Ave. to Nicherson St.

Wash., Seattle—Improve Florentia St. from

Wash., Scattle—City to lay cement walks on East Columbia St., E. Cherry St., E. James St. and Barry Court.

Wash., Olympia—White Salmon Rd. between Husum and Trout Lake in Klickitat Co. will be constructed at cost of \$150,000; county co-operating to extent of \$100,000. National Forest Hwy. funds in sum of \$575,000 made available for constr. of 50 mi. of hwy. in Washington. For constr. of 5 mi. of road between Hughes and Orient, on Inland Empire St. Hwy., \$50,000 will be expended from federal funds and an equal amount from state co-operative funds. Three and one-half mi. Republic-Wauconda Rd. will be surfaced at cost of \$15,000.

W. Va., Charleston—Provision will be made in county budget for the improvement of the road along the south side of the Kanawha river from the South Charleston bridge to the city line. This section of road is about one and a half miles long.

SEWERAGE AND SANITATION

Cal., San Luis Obispe—\$20,000 bonds voted here for sewer impvts; also \$15,000 for septic tank.
Fla., Minmi—\$214,000 will be expended for sewer construction here.
Ia., Glidden—Making plans sanitary sewerage system, \$30,000. W. E. Buell & Co., 205 Davidson Bldg., Sloux City, engrs.

In., Glidden—Making plans sanitary sewerage system, \$30,000. W. E. Buell & Co., 205 Davidson Bldg., Sioux City, engrs.

III., E. St. Louis—Resolution calling for constr. of sewer system in north-eastern section of E. St. Louis known as Lansdowne, passed by council. Proj. when completed will be 18 mi. in leneth and will drain approx. 800 acres of land. Est. cost \$504,000.

Ia., Spirit Lake—Plans drawn for county drain to cost \$300,000 in Dickinson county for county comr., Guy Poughorn, Aud., Spirit Lake. R. A. Furman, Engr.

Ky., Henderson—Bids will be asked in about 60 days for constructing complete system of sewerage. Prelim. plans being prepared. Jno. A. Cunningham, Commr. Pub. Wks. and Prop.

Mass., Boston—Mayor has approved orders of Board of Street Commrs. for constr. work as follows: San. sewer 24 in. earthen pipe, surface drain 4 ft. 6 in., 4 ft. 3 in. and 3 ft. circ. conc. and 2 catch basins in Western Ave., bet. Telford St. and Everett St. in Brighton Dist. at est. cost of \$15,000; overflow 6 ft. by 6 ft. conc. in Farragut Rd. extension between 352 ft. northwest of E. First St. and 450 ft. northwesterly, in S. Boston Dist. at est. cost of \$43,300; san. sewer of 1 ft. 6 in. by 1 ft. 3 in. conc. surf. drain of 1 ft. 6 in. by 1 ft. 3 in. conc. surf. drain of 1 ft. 6 in. by 1 ft. 3 in. conc. surf. drain of 1 ft. 6 in. by 1 ft. 3 in. conces and easterly in Roxbury Dist., est. cost \$6,766.

Mich., Detroit—Herewith is draft of ordinance covering the changes in the grades of Ashland and Kercheval Aves. required to permit of the construction of the Public Sewer in Ashland Ave. The ordinance has been certified.

Mich., Wayne—An election will be held on July 18 to vote the issuance of

Mich., Wayne—An election will be held on July 18 to vote the issuance of Sewer bonds to the amount of \$100,000.

Mich., Lansing—That it is the intention of said council to construct 1753 feet of sewer in Main St., Buffalo St. to West City Limits; and Buffalo St., Main St. to Grand River, in the sewer and drain district, and that the plat and diagram thereof made and returned.

Main St. to Grand River, in the sever and drain district, and that the plat and drain district, and that the plat and diagram thereof made and returned.

Mich., Grand Rapids—Construct a sewer in Pettibone St. from Bridge St. Alley (North) to First St., including the construction of the necessary manholes, catch basins, Y branches and sewer laterals.

Mich., Lansing—That it is the intention of said council to construct 2209 feet of sewer in Ottawa St., Chestnut St. to Pine St.; Pine St., Ottawa St. to Shiawassee St.; Ionia St., Pine St. to Sycamore St., and Sycamore St., Ionia to Shiawassee St.; In the 1st and 6th sewer districts, and that the plat and diagram thereof made and returned.

Minn., St. Paul—City Council passed order for installation of new sewer on Grand Ave., Lexington to Avon, to replace present sewers. Est. cost of new sewer \$21,055.

Minn., St. Charles—Plans being prepared for sewer system by Engr. Chas. L. Pillsbury Co., 1200 2nd Ave. S. Minneapolls. R. Dixon, City Cik.

Minn., Pine River—Election in favor of issuing Outstanding Warrants, Sewer and Fire Apparatus bonds to the amount of \$12,000.

Minn., St. Paul—Res. to construct a sewer on Burgess St. from Mackubin St. to a point 20 feet east of the northeesterly line of Como Ave.

JULY

Minn., St. Paul—To construct a sewer on Hartford Ave. from Hamline Ave. to Edgecumbe Rd.

Minn., St. Paul—To construct a sewer on Wyoming St. from 70 feet west of Stryker Ave. to Winslow Ave.

Mo., Kansas City—City will extend Blue Run sewer. Expend \$2,000,000 for piping. Paul A. Hartung, Engr. Will construct \$1,000,000 worth of additional sewers during year.

Mo., Kansas City—Park Board contemplates installing sewer along Swope Park. Est. cost \$27,000.

Mo., Cameron—Benham Engrg. Co., Kansas City, Mo., retained as Cons. Engrs. by city for impvts. to sewage disposal plant.

Mo., Springfield, — Sewer system: \$500,000. Springfield, Mo. City Engr., G. W. Culler, City Hall, Springfield, Mo. Owner, City of Springfield, care city cik., Springfield, Mo. Bond vote in Aug.

Aug.

Neb., Grand Island—Ord. passed to Create Sewer Dist. 80, from Clark to Broadwell Ave., 12th to 13th Sts. H. E. Clifford, City Clk. \$300,000 bonds voted for storm, san. sewer system and sewage disp. plant hore. H. E. Clifford, Clk. W. E. Buell, 205-7 Davidson Bldg., Sloux City, Ia., Engrs. Ord. also passed to create Sewer Dist. 79 from Oak to Locust St. bet. 14th and 15th Sts.

Bidg., Sloux City, Ia., Engrs. Ord. also passed to create Sewer Dist. 79 from Oak to Locust St. bet. 14th and 15th Sts.

Neb., Wayne—At meeting of City Council it was decided to extend sanitary sewer into eastern section of town. Engineer will be retained to look after the work.

N. H., Manchester—Specfs. for new sewer project being worked out by Hwy. Surveyor Conant. Reinf. conc. pipe to be made at sewer job on Beech Street will. be contracted for. Sewer work 1½ mi. in length.

N. J., Jersey City—An ordinance for making private connections with sewer, gas and water mains or conduits for wires in Oxford Ave. between Bergen Ave. and Sackett St., in the city of Jersey City.

N. J., Jersey City—Construction of a sewer under the easterly sidewalk of the Hudson Boulevard, from a point about 70 feet south of Spruce St. also a sewer under the wosterly sidewalk of Hudson Boulevard, from a point about 45 feet south of Floyd St. to Elm St.; thence through Elm St. to the easterly line of Liberty Ave.; thence through an easement to Tonnele Ave., connecting with present sewer in Tonnele Ave.

N. J., East Orange—An ordinance providing for the laying of eight inch diameter sanitary sewers: In Freeman Ave. from Rhode Island Ave. to the Newark city line, \$1,500; in Oak St. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Grand Ave. to Oak St., \$500; in Grand Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Grand Ave. to Oak St., \$500; in Grand Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont Ave., \$2,000; in Tremont Ave. from Rhode Island Ave. to Tremont

plant.

N. Y., Gouverneur—Bd. Village Trustees plan to extend storm water and san. sewerage system. Est. cost \$25,-000 to \$30,000. G. F. Dawley, Pres.

N. Y., Brooklyn—Final approval given by Boro. Pres. Connolly to plans and specfs. for 5 sewer extensions, two of which are in Corona, two in Flushing, and one in Ridgewood.

O., Lima—City Comn. has adopted plans for direct oxidation sewage disposal plant.

O., Barnesville—City will install sewerage system at estimated cost of \$450,000.

Maple Heights—Will advertise

9450,000.

O. Maple Heights—Will advertise for bids in July for sewerage system. Segment blk. and some brick. Also sewage treatment station. Est. cost \$300,000.

O., Van Wert—H. A. Loe, mayor, has formally advertised the special election on Aug. 8 at which this city will yote on the issuance of \$392,000 in

okla., Muskogee—City will soon ask bids for about 9,000 lin. ft. sanitary

sewers.
Out., Eastview—Soon receives bids extending sewers in Hannah and Durocher Sts., concrete or vitr. brick. \$38,000. J. C. S. Wolfe, town clerk.
Pa., Sharon—Completing plans for new sewage disposal plant, 1,735,000 gal. capacity, to exceed \$50,000.
Pa., Morrisville—Making plans 14.3 mi. sewers and sewage treatment plant \$316,000.
Tex., Leonard—Voted on \$40,000 Sewer System Construction bonds.
Tex., Lubboek—An election held on July 18 to vote the issuance of bonds, sewer, \$100,000; water 6%, \$50,000.

Va., Richmond—Contract for sewers in Grace St., 9th to 1st Sts., including 1660 lin. ft. 30-36 in. segment blk., and 768 lin. ft. 15-24 in. terra cotta pipe, to Wingo & Deaner, P. O. Box 316, at \$36,271; Main St., 3th to 13th Sts., 1586 lin. ft. 30-42 in. segment blk. to Kelly & McLane, 800 W. Cary St., at \$40,452; 9th St., Main to Grace Sts., and Franklin St., 7th to 9th Sts., 1362 lin. it. 24-30 in. segment to A. J. Boyle, 102 Wetmore Ave., Baltimore, Md., at \$24,544.

Wash., Seattle-Impv. Garden St. by

Wash, Seattle—Impv. Garden St. by sewer system.

Wis., Milwaukee — Metropolitan sewerage commission considering plans for intercepting sewer for sewage of Whitefish Bay and Shorewood; also another to take care of W. Milwaukee and City of West Allis. Est. cost of two sewers, approx. \$150,000.

Wis., Sturgeon Bay—The city council have planned for building of nearly two miles of sewer work which will start as soon as contracts are let. The Board of Public Works is now advertising for bids.

Wis., Madison—Plans sewage disposal plant on Lake Monona. H. C. Buser, city clk. Engineer not selected.

Wis., Marshfield—Making plans sanitary and storm sewers and septic tank, \$40,000. T. Pankow, Washington Bldg., Madison, engr.

\$40,000. 1. 1. Madison, engr.

LIGHTING AND POWER

Colo., Seibert—An issue electric light bonds of \$6,000.

Minn., Sauk Centre—Bond issue electric light and power plant \$10,000.

Neb., Alvo—Village voted \$8,500 bonds for erect plant and transmission line. Care Village Clk.

Neb., Wahoo—Election July 25 to vote an issue electric lighting bonds of \$25,000. Due in not exceeding 20 years.

o., Toledo—To improve by lighting with electric light Moore St. between Chestnut St. and Mulberry St.
Okla., Noble—To vote an issue of electric light and power line bonds of \$11,000.

Pa., Chambersburg—Electric light bonds of \$80,000 approved by the Coun-

bonds of \$80,000 approved by the Council.

S. D., Plankinton—Spcl. elect. July 17 to vote \$16,000 light plant bonds. Wash. Wenatchee—Work of constructing a 110,000 volt transmission line from a hydro-electric plant in the Puget Sound district to Wenatchee, a distance of approximately 120 mi, started by the Puget Sound Power & Light Co.

Wash. Seattle—Two electric light and power properties and two water systems, located at Montesano and Elma and South Bend and Tenino, formerly operated by the Northwest Electric Light & Power Co., have been taken over by the Washington Coast Utilities Co. This work will involve the construction of approximately 12 mi. of transmission line betwen the cities of Aberdeen and Montesano and Elma and the rearrangement and reconstruction of lines within the latter named towns. Also one sub-station will be erected in Montesano named towns. Also one sub-station will be erected in Montesano.

WATER SUPPLY

Ark., Fort Smith — Improvements program includes the laying of mains to sections of the city not served at present and the building of a large reservoir on Crowe Hill to serve the section taken by the extension.

Cal., Vernon—Howard McCurdy, 335 Pacific Elec. Bldg., Los Angeles, City Engr. of Vernon, has submitted to city trustees a report on new hign pressure water sys. for industrial city adioining Los Angeles. Est. cost \$450,000. Bond issue will be submitted soon. Proj. will involve about 63,000 ft. cast iron pipe, 8, 10, 12, 14 and 16-in. diam; approx. 2,908 tons pipe and 57 tons fittings; 100 gate valves and 205 fire hydrants. New well will be driven on city property at Vernon and Santa Fe Aves. and motor-driven turbing pump with capacity of 1,500 gals. per min. under 125 ft. head will be installed. There will be a 3,000,000 gal. reservoir, excav. and embank., 182x182 ft. at top and 16 ft. deep with 2 to 1 slopes lined with conc., reinf. with wire mesh; wooden roof; excav. about 2,700 cu. yds. 3 centrif. pumps, 1,250 gals. per min. operated by gas motors, will pump water from reservoir into mains. Cal., Pasadena—Municipal Water Dept. will lay 20-in. main on E. Colorado St. betwen Euclid and Mentor Aves. Est. cost \$50,000.

Cal., Sawtelle—An election in the near future to vote an issue of Water System bonds of \$205,000.

Cal., San Diego—Hydr. Engr. H. N. Savage preparing detailed plans for work necessary to enlarge spillway at Morena dam. Est. cost of work \$100,000.

Colo., Alamosa—An issue of 5% 15-year Water Extension bonds to the amount of \$30,000.

amount of \$30,000.

Colo., Oak Creek.—City planning to constr. new water works storage reservoir on Oak Creek. Modern filtr. sys. will also be installed. Plans to be prepared by Chas. Vail, Engr. of State Public Utilities Comn.

Colo., Grand Jet.—Specfs. and estimates being prepared for new water works imputs., including new reservoir. Est. cost \$150,000.

Colo., Colorado Springs—Col. A. R. Humphreys, Denver, reported to be planning crection of a \$100,000 water impvt. proj. on Goose Creek above Wagon Wheel Gap.

Ill., Chicago—Water mains to be laid in S. California Ave., N. Harlin Ave., Talcott Ave., N. Neva Ave. to Bryn Mawr Ave.

Ill., Chiengo—Water mains to be laid in S. California Ave., N. Harlin Ave., Talcott Ave., N. Neva Ave. to Bryn Mawr Ave.

Ill., Chiengo—Water supply pipes to be laid in Gunnison St., Kenilworth Ave., N. Massasoit Ave., N. Parkside Ave., and various other streets.

Ia., Marshalltown — City contemplates constr. of water plant. Alvord Burdick, 8 S. Dearborn St., Chicago, Cons. Engrs. \$355,000. Anne McMahon, City Cik.

Ia., Oskaloosa—\$230,000 bonds carried for purch. of water works plant; \$70,000 for water works impvts. and \$370,000 for water works impvts. and \$370,000 for water works of United Water, Gas & Elec. Co. No date set for bond election by the people. In meantime, however, city has reached agreement with company that latter is to install new mains and pumping station to extent of \$150,000 at once and to improve the service. Agreement also includes provision for establishment of water mains under 13 blks. of new pavement which is to be built. Mich., River Rouge—Having plans prepared for submerged water mains under River Rouge—Having plans prepared for submerged water mains under River Rouge to connect city system with that of Detroit, incl. 600 ft. 30 in. c.l. or steel pipe, 40 ft. below water surface. \$75,000. M. L. Brown & Son, Capitol Bldg., Detroit, engrs.

Minn., Sauk Centre—Sealed blds until July 28 for the bonds aggregating \$112,500, water works \$100,000.

Me., Bangor—Sketches for city water supply for city board of water comr., all of Bangor. Lewis D. Thorpe, Engr., 200 Devonshire St., Boston, Mass.

Mo., Webb City—The city council at Webb City, Mo., has appointed a committee to investigate the feasibility of building a municipal water works plant that will furnish water to Webb City and Carterville.

Mont., Great Falls — Irrigation—Toole Co. contemp. 2 earth dams, 4 reservoirs, 3,000 ft. 10-in. pipe, 7,900 ft. tunnel. \$10,000,000. J. H. McFariane, Co. Aud. J. A. Johnson, First State Bank Bldg., Shelby. Comsr. Gerharz & Jaqueth, 514 1st Natl. Bank Bldg., Great Falls, Engrs.

Mont., Havre—Irrigation

Aud.

N. Y., Wilson A contract for the construction of a water system has been awarded by the village board of Wilson, N. Y., the amount of the bld being \$70.500

which, N. I., the amount of the bid being \$70.500.

N. Y., Scottsville—Village board rejected all bids received on June 13 for sower and water system in village as too high and will shortly be ready.

N. Y., Canandaigua—Mayor MacFarlane recommends the improvement of the water system at a cost of \$65,000.

N. J., Lebanon—The Clinton Water Company considering building a supply line from its reservoir, near Annadale, to Lebanon.

N. Y., Athens—Meeting held to decide on question of obtaining water supply.

cide on question of obtaining water supply.

N. C., Albemarie—Notice of sale, \$100.000 Water bonds, \$50.000 Sidewalk bonds of the town of Albemarie, N. C. O., Toledo—A filtration plant in the Maumee Bay across the channel from Turtle Island. to furnish water to a city of 500,000 inhabitants, the construction of a breakwater from Cedar Point on the east to the waterworks plant, and another from the west promontory to Turtle Island.

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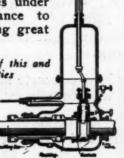
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O., Columbus—Contemplates plans for a large area swimming pool.

O., Georgetown—Need of an adequate water system here.

O., Newcomerstown—To submit a bond issue to erect and maintain a waterworks, providing the state utility commission does not make a reduction of the present schedule rate to consumers. The issue will be for from \$100,000 to \$120,000.

O., Hamilton—Mayor Hughes declines to sign \$56,000 in waterworks bonds as yet, hearing rumors that the entire project may be enjoined in court.

O., Delphos—The council approved the plans of the Kiwanis Club for the improvement of waterworks park. A swimming pool will come first.

O., Barberton—J. N. Chester, Engrs., Union Bank Bldg., Pittsburgh, Pa., retained by City to prepare plans and specifs, for an iron removal plant; also to make an investigation and report on the water supply.

Okla., Tulsa—Bids will be opened in Summer for \$6,800,000 water supply project. J. D. Trammell, Cons. Engr., Ft. Worth, Tex.

Ont., Eastview—Soon receives bids for water mains, cement or c. i. \$52,000. J. C. S. Wolfe, Town Clk.

Ont., Port Credit—Detailed plan of proposed water works sys., submitted to Town Council by Wm. Storrie of Gore Nasmith & Storrie, Cons. Engrs., Toronto. Est. cost \$120,000. Plans approved by Provincial Bd. of Health.

proved by Provincial Bd. of Health.

Ont., Thornbury—Plans beirg prepared for new water works sys. \$30,-000. Prices wanted on pumps, pipe, etc. James, Proctor & Rediern, 36 Toronto St., Toronto, Engrs. These engineers also consultants on water works for Woodbridge, Ontario. Prices wanted on material and equipment.

Que., Montreal—To recommend the laying of a 48-in. water main from Pt. St. Charles Pumping Sta. to a point in vicinity of Place Viger Hotel, a dist. of about 2 mi.

Que., Hull—\$59,000 bonds voted here for extension of water works and sewer systems. T. Lanctot, City Engr.

R. I., Cent. Falls—Town considering impyt, and extension of water pipe system. \$150,000. S. P. Cummings, City Engr.

Tex., Lamesa—Plans being prepared by Elrod Engrg. Co., Interurban Bldg., Dallas, for water works impyts. \$60,-000. M. H. Horton, City Secy.

Tex., Pampa—\$80,000 bonds voted for installation of water works and sewer systems.

Tex., Abilene—About \$100,000 to be spent on a new water system for Ablene, the city having taken over the control of the distribution system on July 1 when municipal ownership became a fact. Water Supt. Grimes placed a large force of men at work at Lake Abilene constructing a conc. dam basin just below the dam.

Va., Ashland—Extension of water and sewer system at cost of \$70,000 being considered.

Wash., Tacoma—City expects to replace 30-in. wooden main in So. Cushman Dist. with 20-in. cast iron pipe. Est. cost \$84,550. E. C. Marriey, City Eng.

wash., Puyallup—\$75,000 bonds voted by city to replace water works system, iron or wood pipe. O. C. Gregory, Eng. Wash., Walla Walla—Engr. E. B. Hussey, Alaska Bldg., Seattle, reports completion of plans and spects. for Div. No. 2 of water works extension program. Div. No. 2 of the development will necessitate expendt of about \$140,000. Work will include sonstr. of 4-mi. 20-in. pipe line into the Wenaha national forest to tap pure water supply, constr. of gravity type dam 100 ft. wide and 16-ft. high, constr. of sluice gates, telephone pole line and wagon road into intake.

Wis., Dodgeville — Plans mains in Merrimac, West Division, 11th and Washington Sts., and improvements to pumping station. \$25,000. J. B. Lewis, Clk. Engr. not selected.

Wis., Rice Lake—Water works extensions and impvts. planned. Est. cost \$40,000. O. Jenson, Cik. Engr. not selected.

W. Va., Charleston—Pla: for a more wholesome supply of rater for the city of Logan, W. Va. d. cussed.

Cal., North Sacramento—A bond election for \$9,850 will be held for the purpose of providing North Sacramento and Ragginwood with fire trucks.

Conn., Terryville—Appropriation of \$25,000 made for purchase of fire apparatus.

III., Ottawa—To reduce the amount of the proposed bond issue for the purchase of fire department equipment to \$16,000 instead of \$20,000, as originally planned.

planned.

Md., Cumberland—Residents at La Vale plan organization of a fire department. The management of People's Park offers to house the apparatus if such should be purchased.

Mass., Fall River—Swansea voters will have the opportunity to cast a ballot on the question of whether Swansea shall have a fire department, or at least a piece of chemical fire apparatus.

Mass., Marlboro—City Council cided to purchase auto truck to placed at Central Fire Station.

Mass., Peabody — Recommendation will be made for new hook and ladder

Mass., Ashland—The sum of \$10,000 was appropriated for combination pumping engine, and \$1,000 for fire hose.

Mich., Detroit—Commissioner of Lincoln Park village police dept. petitioned the Council for an adequate fire department to safeguard the property. The present apparatus, which was installed before the youngest Wayne Co. village began its big growth, has proved insufficient to protect the whole village.

N. J., Jersey City—\$14,500 appropriated for the purchase of new fire hydrants for use in the Jersey City water department.

N. J., Woodstown—Boro. Council decided to purchase assembled motor pumper of 600 gallons capacity for \$8,258.90 and motor chemical engine for \$5,396.07.

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Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads are to be improved or reconstructed. The addresses of the division engineers and the counties in which they are in charge will be furnished upon request.

The special attention of bidders is called to "General Information for Bidders" in the itemized proposal, specifications and contract agreement.

HERBERT S. SISSON. Commissioner.

HERBERT S. SISSON, Commissione J. C. FINCH, Secretary.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., July 26, 1922.—SEALED PROPOSALS will be opened in this office at 3 p. m., August 25, 1922, for the extension to workroom of the United States Post Office at Forth Worth, Tex. Drawings and specifications may be obtained from the custodian of site at Fort Worth, Tex., or at this office in the discretion of the Acting Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

BIDS WANTED

Sealed Proposals will be received in this office until 5 o'clock P. M., August 25th, 1922, for the construction of a protection pier at the water works station. Proposals must be submitted on form furnished by the city and all proposals must be accompanied by a certified check for \$100, which shall be forfeited to the city if the bidder whose proposal is accepted fails to enter into contract or furnish the required bonds within 5 days after the award of the contract. Plans and specifications are on file at this office. The city reserves the right to reject any or all bids.

CITY OF ST. JOSEPH,

WATER DEPARTMENT.

Harry Harper, City Clerk,

(5-6)

St. Joseph, Mich.

N. Y., Ossining—Fire equipment bonds to the amount of \$20,000 sold.

N. Y., Brooklyn—Glendale appointed a committee to prepare petitions to the mayor and fire dept., asking for fire protection for Glendale.

O., De Graff—The council is to be asked by the fire dept. for new apparatus. The Silsby steamer is old, the ladder is 40 years old and ricketty, and much more hose is needed.

O., Springfield—Purchase of pumping engine is contemplated.

O., Jackson—Purchase of additional fire truck recommended.

Ore., Salem—Bonds of \$17,500 being urged for the purchasing of fire equipment.

urged for the purchasing of hie equipment.

Pa., Erie—The mayor refuses to approve a \$55,000 bond ordinance, and says the same will be held up in the council as a committee of the whole until the fire alarm question is settled.

Pa., Middletown—Liberty Steam Fire Co. No. 1 has started campaign to raise additional funds for purchase of modern fire equipment.

Pa., Ellwood City—Council urges either repairing old fire truck or purchasing new one.

Pa., Greenville—Borough Council has authorized purchase of fire fighting apparatus.

Pa., Mapleton Depot—Firemen held a festival to secure funds to buy ew

a festival to secure funds to buy sew equipment.

Pa., Erie—A bond issue of \$20,000 for a fire alarm system.

Pa., Reading—The Friendship and Riverside fire companies have received \$1,000 each for purchasing fire apparents. ratus.

ratus.

Pa., Cresson—The Cresson Volunteer
Fire Co. is considering purchasing a
truck to carry additional hose.

R. I., Warwick—The Vigilant Fire
Co. of the Apponaug District is in need
of a larger fire truck with a pumper.

BRIDGES

Fla., Daytona—A new bridge company, called the Seabreeze Bridge Co., hoaded by Mayor P. D. Gold of Seabreeze, has been formed to purchase the old north bridge from the Armstrong interests and construct a new \$25,000 toll bridge to span the Halifax River at the same location.

Fla., West Palm Beach—Bridge: Over Lake Worth at West Palm Beach, Fla. Engr. Harrington, Howard & Ash, 10th floor, Orear-Leslie bldg., K. C., Mo. Owner, Palm Beach, County, care Co. Clk., Palm Beach, Fla. Gen. contr. let to C. E. Hillyer, Jacksonville, Fla., on percentage basis. Work to start soon.

Ind., Hammond—The County Comrs. have adopted plans for a bridge over the railway tracks just east of Schererville to cost \$25,000.

Ind., Indianapolis—The State Hwy.

rainway tracks just east of schefer-ville to cost \$25,000.

Ind., Indianapolis—The State Hwy. Comn. will open bids on ten bridges, costing approximately \$120,000, at 10 a. m., Aug. 8, it was announced today. Six of the bridges are to be built with federal aid. Three of the bridges are to be constructed of steel and the remainder are to be built of reinforced concrete. The bridges are in Putnam, St. Joseph, Spencer, Warrick, Orange, Starke, Blackford, Noble and Posey counties. Two of the steel bridges are to be in Warrick county, and the other one in Starke. On the steel structures bidders are invited to submit proposals on substructure, the superstructure, or the complete bridge. Combination bids also will be considered.

Md., Shelby Co.—A large lot of bridge

Md., Shelby Co.—A large lot of bridge and culvert construction work will be done in Shelby county this fall.

Minn., Clover (P. O. Lengby)—Bids in Aug. 4 for \$16,500 road and bridge bonds. G. C. Richardson, City Clk.

bonds. G. C. Richardson, City Clk.

O. Urbana—As soon as bonds can be issued and the county comrs. will award contracts for the construction of three bridges. Dugan bridge, an 80 ft. steel bridge over Bear Creek, southeast of Urbana, and a large bridge a short distance west of Spring Hills.

O. Fostoria—Will rebuild the Van Buren St. bridge, place new abutments at either end and lay a pavement of pine blocks, and to give floor of the Vine St. bridge a dressing of an asphalt preparation.

O. Cuyahoga Falls—H. G. Sours.

O., Cuyahoga Falls—H. G. Sours, resident state engineer, will take up the question of a state aid for the construction of a foot bridge at the Gorge. O., Youngstown—The council passed an ordinance authorizing repairs made to the Elm St. bridge.

O., Mt. Gilead—Sold \$23,034 in bonds for the construction of the Riley bridge in Peru township; Bartlett bridge, Westfield township, and Mc-Kinstry bridge in Canaan township, and the repair of the Edison bridge in Gilead township.

Pa., Germantown—Petition asking that the present iron and wooden bridge on Walnut lane over Lincoln drive be replaced by a concrete bridge costing \$250,000.

costing \$250,000.

Tenn., Chattanooga — WhitesideStearns Co., A. T. Whiteside, 609
James bldg., Chattanooga, let contract
for overhead R. R. bridge in Chattanooga to Ingalls Iron Wks. Co., Birmingham, Ala.

Tex., New Hoston—Bridges: \$100,000.
New Boston. Engr. Hess & Skinner,
Southwestern Life bldg., Dallas, Tex.
Owner, Bowie & Cass Counties, O. B.
Pirkey, New Boston. Steel span over
main channel. Bids within next 30
days.

days.

Tex., Waco—Bridges: \$37,885.73. Engineer, Manton Hannah. Owner, McLennan County, J. P. Lester, all of Waco. Gen. contr. let to McCoy & Richard, Arlington, Tex.

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137-147 Fifteenth St., Jersey City

Tex., Ft. Worth—Bridge: \$17,250, & bridge: \$33,000. Engr. R. V. Glenn. Owner, Tarrant County, Hugh L. Small. Conc. & steel. Drawing plans.

Wash., Senttle—To erect and const. a steel bascule bridge and two side spans at West Waterway over West

spans at W Spokane St.

Spokane St.

W. Virginia—Bids for the construction of 17 bridges and one state road will be received by the state road commission up to 10 a. m., August 15, when contracts will be awarded. Three of the proposed bridges, in Kanawha county, one at Hugheston, the second at Cedar Grove and the third at Witcher. The road project, known as 3126, is two-tenths of a mile in Brooke county. It is to be graded and paved with waterbound macadam.

MISCELLANEOUS

Fla., St. Petersburg—A bond issue of \$1,052,000 proposed to St. Petersburg to provide for many needed improvements. Dir. of Wks. E. C. Garvan asked for \$500,000 for drainage, a new incinerator and concrete bridges to replace the wooden bridges in the city.

Ida., Boise—An application to form an irrigation district embracing lands in Bannock and Caribou counties filed with W. G. Swendsen, State Comr. of Reclamation. The district is known as the Empire irrigation district, and contains about 40,000 acres of land. The district is one of the units of the Greater Fort Hall project.

Ind., Indianapolis—Fifty-three public utility companies in Indiana will spend about \$5,000,000 between July 1 and December 31 on new equipment and plant extensions.

Mo., Springfield—Springfield Gas and Electric Co. proposes an investment of 800,000 to build a power plant.

Mont., Glendive—Glendive will issue \$60,000 of bonds for new cast iron pipes for the municipal water system.

O. Chillicothe—Service Dir. Harry E. Gartner announces his conclusion that garbage disposal plant or incinerator is the only solution to the dump complaint and problem here.

O., Cleveland—Safety Dir. Maline has presented estimates for the erection of a proposed new garbage plant. These range from \$1,000,000 to \$3,000,000. Construction of a \$2,062,000 new high service pumping station at the Baldwin reservoir site has been assured by the passage of an ordinance authorizing an expenditure of funds for the work.

O., Portsmouth—Plans to install garbage incinerator, 60 ton daily capacity. \$21,000. Invites correspondence from manufacturers of incinera-

Wash, Wenatchee—The Methow-Okanogan irrigation district stated that the report of the State on the most feasible plan for building the canal for this project and estimate of the cost will be ready before Aug. 1.

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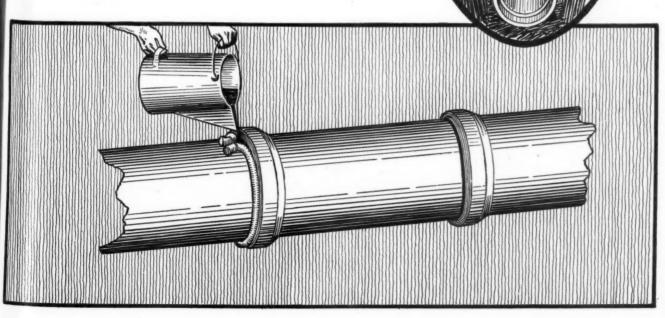
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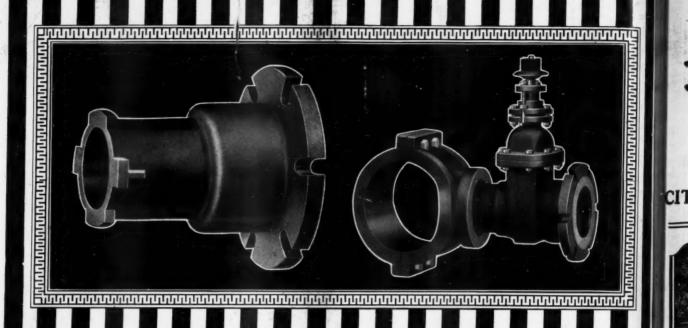
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